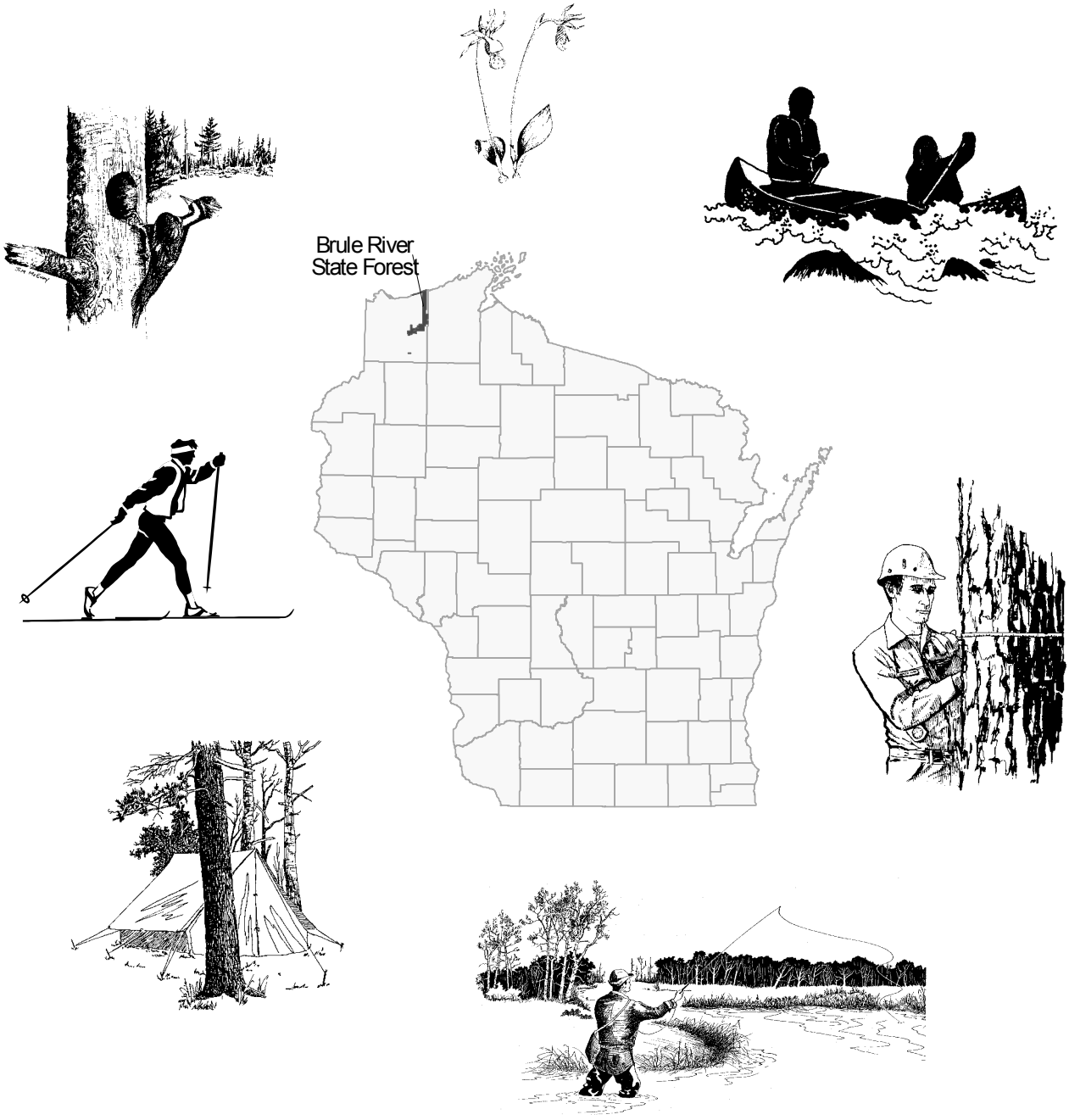
Brule River State Forest

Master Plan and Environmental Impact Statement



May 2003

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Acknowledgments

Authors and Editors
Kent Van Horn, Ken Brokaw and Steve Petersen

Contributors
Bob Dall, Paul DeLong, Bob Dubois, Eric Epstein, Dan Egan, Kate Fitzgerald, Mike Keniry, Greg Kessler, Frank Koshere, Jody Les, Coleen Matula, Bruce Moss, Dennis Pratt, Robert Roden , Jeff Schimpf, Melissa R. Sette-Lake, Al Shea, Dave Schulz, Joanne Tooley and Tom Watkins.

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STATE OF WISCONSIN

Master Plan and Environmental Impact Statement

for the

Brule River State Forest
(Douglas County)

Proposed by the

WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Analysis Prepared by

WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Northern Region Land Program,
Division of Forestry,
And other DNR Staff

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CHAPTER ONE

INTRODUCTION AND SUMMARY

PROPERTY DESCRIPTION

The Brule River State Forest is a remarkable place with a rich natural and cultural history and unique opportunities for restoration and management to provide the features that people have valued for so many generations. Located in eastern Douglas County in northwest Wisconsin, the Brule River State forest is approximately 30 miles north to south. It ranges from six miles wide at the south end, two miles wide for much of its length, and has eight miles of frontage on Lake Superior. The town of Brule, near BRSF headquarters, is at the junction of HWY 2 and HWY 27 and is approximately 35 miles east of the city of Superior. The 1979 master plan project boundary includes approximately 50,000 acres of which 40,882 acres are in state ownership. BRSF contains the entire 44 mile long Bois Brule River and 45% of its watershed. There is a total of 165 miles of stream length including 74 named and unnamed streams and there are five small lakes within the boundary.

Three major ecoregions are represented on BRSF. The Lake Superior Clay Plain, formerly covered by a unique form of boreal forest, today is a landscape that is fragmented into farmland, aspen stands and spruce-fir remnants. The Bayfield Sand Barrens once supported an extensive pine barrens and dry pine-oak forest cover. Pine plantations dominate this region, with sandy, poor soils and level to rolling topography. It is also the site of the "Brule Spillway", a complex of unique natural features. The Mille Lacs Uplands is a ridge of igneous bedrock that wedges between the other two ecoregions and supports one of the few areas of northern hardwood forest on the Brule River State Forest.

Present forest cover includes 14,000 acres of aspen, 1,400 acres of white birch, 10,000 acres of red, jack or white pine, 2,300 acres of scrub oak/pine barrens, 2,200 acres of fir/spruce cover, 1,500 acres of swamp conifers, 1,000 acres of hardwoods, and 1,100 acres of swamp hardwoods. A diversity of habitats located within BRSF is reflected in an equally diverse mix of bird and mammal species including white-tail deer, black bear, beaver, otter, fisher, mink, bobcat, timber wolf, and ruffed and sharp-tailed grouse. More than 200 species of birds have been recorded in the Brule River State Forest.

Forty-four rare species of special concern, three state endangered and seven state threatened have been documented on the Brule River State Forest. Some of these species have both state and federal protection status. Over 90 occurrences of 20 natural communities were surveyed on the property. Most of these rare species on the Brule River State Forest (BRSF) are associated with aquatic or wetland habitats.

The coldwater fishery supports both native and introduced fish species. Species such as resident and anadromous trout and salmon include brook, rainbow, and brown trout, and Coho and Chinook salmon. A lamprey barrier exists on the lower river to block passage of sea lampreys to their previously productive spawning areas.

The Brule River State Forest is highly regarded for the high quality water based recreation opportunities it offers. The river is the premier trout fishery in the region and attracts anglers from across the state, nation, and around the world. The upper and lower stretches of the river combine to offer canoeing and kayaking opportunities ranging from Class I to Class III (high water) that are not comparable to any other in the region.

The property also offers exceptional forest based recreation. Hunting, particularly for deer, bears, and grouse, is popular on the forest. The property is the official "portal" for the North Country National Scenic Trail as it extends from North Dakota to Vermont. There are numerous other trail uses on the forest including hiking, snowshoeing, and cross-country skiing on the very popular Afterhours Ski Trail.

HISTORY AND BACKGROUND OF THE PROPERTY

The Bois Brule River has been an important corridor through history. Following the ice age it was the southern drainage of Glacial Lake DuLuth. It was an important travel route for early Native Americans. European attention was first documented in 1680 when Daniel Greysolon DuLuth ascended the "burnt river". Later, it became the critical travel route for explorers, trappers, fur traders and missionaries traveling from Lake Superior to the St. Croix River and points beyond along the famous Brule/St. Croix Portage Trail.

The Bois Brule River's modern history began in the mid to late 1800s when families would travel to the river and camp. Its beauty and the sporting opportunities to fish and hunt remained with them. These early families enjoyed the river and began to build lodges and cabins to spend more time along the river. Some of these lodges are quite exquisite and are still owned by the original families. These families have taken great care over the generations to preserve and protect their properties. This is evidenced by The Nature Conservancy being able to acquire voluntary conservation easements on almost three-quarters of the private lands with in the forest boundary.

The lure of the Bois Brule River attracted at least five presidents to its banks. Visits by presidents Grant, Cleveland, Coolidge, Hoover, and Eisenhower have been documented. President Coolidge made the Cedar Island Estate his "summer White House" in the summer of 1928 and housed the federal government to Central High School in Superior.

In the 1870s exploitive logging of the pine forests began. This was followed by devastating forest fires that effected lands that were not protected by the river valley and the landowners of the lodges along the river. The land has also been managed under various agricultural practices. Most of which were unsuccessful.

Following the initial donation of 4,320 acres from Frederick Weyerhauser in 1907, there were several acquisitions that brought state ownership to about 9,000 acres in 1911. Little additional land was acquired until after BRSF was officially established in 1932 and the state began to acquire tax delinquent failed farmland. At this time the entire forest boundary was south of HWY 2. A boundary change in 1945 extended the project to the southwest as far as Lake St. Croix and north to HWY 2. In 1956 the boundary was extended to one mile south of CTH FF and in 1959 the boundary was expanded to include an area adjacent to Lake Minnesuing at the south and the Mouth of the Brule River at the north. The last adjustment to the property boundary was in 1979 when the Lake Superior shoreline ownership was extended six miles to the west and as much as a mile to the south of the lake.

Camp Brule Civilian Conservation Corp (CCC) camp was established in 1933 and from then until 1942, the CCC fought fires, planted trees, performed habitat work in the Brule River and improved the fish hatchery. They had a powerful influence on the re-establishment of forests on the old farm fields and burned over lands.

In the 1950s a full-time manager was assigned to the Brule River State Forest and a sustained yield forestry program and recreational facilities began to be developed. The first forest staff was stationed at the former Gordon State Forest Nursery. In 1963 the staff moved to quarters at the Brule Ranger Station. Since the 1950s the BRSF has had a permanent staff of a Superintendent, a Forester, and a Ranger.

STATUTORY PURPOSE OF THE PROPERTY AND REGULATORY REQUIREMENTS

The Brule River State Forest is designated as a state forest under Wisconsin Statute 28.04, Management of State Forests, Section (2) Purposes and Benefits of State Forests reads:

(1) The department shall manage the state forests to benefit the present and future generations of residents of this state, recognizing that the state forests contribute to local and statewide economies and to a healthy natural environment. The department shall assure the practice of sustainable forestry and use it to assure that state forests can provide a full range of benefits for present and future generations. The department shall also assure that the management of state forests is consistent with the ecological capability of the state forest land and with the long-term maintenance of sustainable forest communities and ecosystems. These benefits include soil protection, public hunting, protection of water quality, production of recurring forest products, outdoor recreation, native biological diversity, aquatic and terrestrial wildlife, and aesthetics. The range of benefits provided by the department in each state forest shall reflect its unique character and position in the regional landscape.

(2) In managing the state forests, the department shall recognize that not all benefits under par. (a) can or should be provided in every area of a state forest.

(3) In managing the state forests, the department shall recognize that management may consist of both active and passive techniques.

Sustainable forestry, as used here, is defined by Wisconsin Statute 28.04 (e): "the practice of managing dynamic forest ecosystems to provide ecological, economic, social, and cultural benefits for present and future generations."

OVERVIEW OF PROPERTY MANAGEMENT PLAN

The overall management theme described in this plan is taken from Wisconsin State Statute – Chapter 28.04, what state forests are intended to be. This Master Plan has been developed to take into full consideration, the unique physical, ecological, historical and sociological characteristics of the Brule River State Forest that make it different from any other public property. These unique characteristics of the property, along with the best scientific information available and input received from the public and other units of government, have functioned as the fundamental building blocks of this Master Plan. Additionally, at the beginning of the master planning process, the Department in collaboration with public participants and tribal representatives, developed a Vision Statement and a set of Property Goals (see Chapter Two) that have served to guide the master plan's development.

Ecologically, the Brule River State Forest will be managed with an emphasis on restoring, enhancing, or maintaining ecosystems that provide multiple benefits and are unique to this forest. Socially, BRSF will be managed to continue to provide unique angling, hunting, canoeing, kayaking, camping, and cross-country skiing opportunities. Motorized recreation will be maintained at its current level on designated trails and routes.

Land Management

Ecosystem management on Brule River State Forest is directed by the three major ecological landtypes that are represented on BRSF. These landtypes exist with gradations between them. The Brule River State Forest will be managed according to the ecological potential of a site. Significant portions of BRSF will be classified as native community management or scenic management areas. These areas will be guided through natural processes and varying degrees of management towards the desired natural community. The plan for managing BRSF's resources has been developed to increase the biological diversity and develop a forest tree cover with a variety of age classes and to gradually restore portions of BRSF to an ecologically appropriate condition, that more closely resembles "old growth" native communities.

The Lake Superior Clay Plain, roughly the area north of HWY 2, will be managed to restore appropriate natural communities, provide wildlife habitat, maintain high quality water resources and provide scenic values. The area north of CTH FF, will be managed to restore a boreal type of forest dominated by white pine, white spruce, and white birch with associates white cedar, aspen, and other boreal components. The strategy here is to set aside reference areas as a means to measure success of other methods. These reference areas most closely represent the goal of restoration for the area. On other areas varying methods will be used including active and passive management to determine the most effective means to restore this type of ecosystem. There is much to be learned about this unique landscape and the research performed here may be applied elsewhere. In addition to the boreal forest restoration area, the area between CTH FF and HWY 2 will be managed to provide a mix of older northern hardwood forest, a younger aspen forest and an area of more mature forest for scenic values. All restoration and management on the clay plain will be managed to protect the excellent water quality and aquatic habitat of the Brule River system.

The Bayfield Sand Plain, in the eastern and southern areas of the forest and including the Brule Bog and the Gordon Unit, presents a variety of opportunities. The ecological potential for the area is dictated by the dry sandy soils and ranges from a mixed pine forest to pine barrens to the unique bog and springs that are the headwaters of the Bois Brule and St. Croix Rivers. Management prescriptions complement this potential and range from establishing a mosaic of pine barrens age classes in the southeast to establishment of red and white pine stands to the west.

This area has a balance of forest production areas and native community management areas. Where forest production is a goal it will emphasize diversity and accommodate a blend of species that would have naturally occurred. Methods will be applied to mitigate scenic concerns in production areas and foster as natural appearing a forest as possible. Where native community management is the goal the condition will range from older conifer forests along the bog to shrub and grass dominated area in the barrens.

The Brule Bog will be passively managed, researched, and monitored. State Natural Areas already in place in the bog will be expanded. Research may occur on re-establishing white cedar and regenerating black spruce.

A corridor bordering the Brule River will be a scenic management area. Emphasis will be on developing a mature forest of native species for scenic values.

The Mille Lacs Uplands area will mostly be managed for native communities. These are generally either pine dominated or northern hardwood dominated, depending on the location. There are also areas set aside with the goal of scenic management or native community monitoring.

Recreation Management

Recreation management on BRSF will generally maintain the current capacity of recreational facilities, with some minor changes. The BRSF's recreational facilities and management will continue to focus on the primary recreational activities on the property, including; fishing, paddling and hunting, as well as, hiking, camping, wildlife viewing, cross-country skiing, snowmobiling, etc. The management of recreation will continue to emphasize silent sports and limited, rustic development. Bois Brule Campground will be renovated to remove some individual campsites and a separate group camp will be developed. The Copper Range Campground will have several sites eliminated and redeveloped as walk-in sites, valued for their seclusion.

River access for watercraft and anglers would be maintained at its current level. New facilities such as wells, toilets, and interpretive kiosks will be developed at these sites.

The network of hunter walking trails will be maintained at a level similar to the year 2000 (approximately 30 miles). As habitats change these miles may be shifted to more appropriate areas to provide hunting opportunities.

The picnic area and boat launch at the Mouth of the Brule River will be maintained at its current level of development. A small picnic area and parking lot will be developed at Brackets Corner on the shore of Lake Superior.

The Afterhours Ski Trail system will be maintained and expanded to continue to provide this popular venue. A new 25-mile trail system for skiers will be near Samples Road. This area of BRSF provides exceptional topography sought out by skiers and the development is compatible with the ecological goals of the area. Other hiking trails would be developed to link the North Country National Scenic Trail with the Stony Hill Nature Trail, the fish hatchery, CCC site, and Bois Brule Campground. Motorized recreation is accommodated on the Brule/St. Croix ATV and Snowmobile Trail (winter only) and the Tri-County Corridor.

The Brule River State Forest provides many opportunities to educate users and interpret the environment. A program will be developed to provide interpretive kiosks at the watercraft landings and develop a theme from the headwaters to the mouth of the Brule. A program to develop user ethics, particularly on the part of river users, will be developed to teach respect for the river, other users, and private landowners.

This plan recognizes the role of state forests as described by state statute and acknowledges the unique capabilities of the Brule River State Forest. An earnest attempt has been made to accommodate the many diverse interests people have regarding the property. All these interests were weighed against the ecological capability of the land and the prescriptions described in Chapter Two reflect the decisions made.

The successful implementation of the proposals made in this document depends on increased resources in the form of labor and funding. Three additional permanent staff and additional LTE and supplies and services funding are will be needed.

LAND ACQUISITION OVERVIEW

Chapter Two describes the goals of restoring Boreal Forest and Pine Barrens / Dry Forest ecosystems. Restoration of the rare forest types is not possible on a landscape scale given the current ownership. The master plan proposes adding to BRSF boundary to accommodate this restoration.

Roughly 7,000 acres will be added in the north to extend the boundary from the current state ownership south as far as HWY 13 and west as far as Poplar River Road. Most of this land is industrial forest under single ownership. Acquisition of this area would permit landscape scale restoration of a block of boreal forest. It would also protect several small watersheds that flow to Lake Superior.

To the south of BRSF, bounded by the county line on the east and CTH A to the south is a 25,000-acre block of industrial forestland of particular importance to the restoration of a pine barrens ecosystem. Nearly all of this land is in a single ownership. Included in this area are a number of small seepage lakes.

As in the Real Estate section in this chapter, all purchase of lands is from willing sellers only and at a mutually agreeable price. Payment in lieu of taxes is made to taxing authorities on all lands acquired in the state forest.

OVERVIEW OF THE CURRENT USE AND MANAGEMENT OF THE BRSF

The Brule River State Forest is used and enjoyed by many. Mostly known for its recreation opportunities, it is also an ecological treasure with a diversity of habitats and the headwaters of two of the nations best-known streams, the Bois Brule and the St. Croix. BRSF Management is guided by state statute 28.04, quoted earlier in this chapter. The Brule River State Forest exists because of its unique mix of all the benefits described in state statute 28.04.

Current management of BRSF is by the Department of Natural Resources, Division of Forestry. There is a permanent staff of a Superintendent, a Forester, and a Ranger. They are stationed at the headquarters about two miles south of the village of Brule. Additional staff are hired as Limited Term Employees (LTE) to assist the permanent staff with management and customer services.

The Brule River State Forest crosses three major ecoregions, described elsewhere in this chapter. Current ecosystem management emphasizes restoring, enhancing, and maintaining ecosystems that provide multiple benefits and characteristics of this state forest. Most of the property that makes up BRSF had been cut over, burned over, and was failed farmland prior to state ownership. A majority of the property has been in state ownership for less than the life of the pioneer tree species found on it.

Current forest management uses selective cuts to favor longer-lived climax species and clearcuts to mimic the effects of fire and other disturbance and regenerate forest ecosystems that depend on these events. Planting is done to introduce missing species and establish plantations that will eventually become natural looking mature forests. Little or no active management occurs adjacent to the river or the bog. Certain other areas are also set aside where passive management prevails, such as along Lake Superior and ecologically sensitive areas.

The Brule River State Forest offers world-class outdoor recreation opportunities. For generations people have traveled to the Brule from around the world to go trout fishing. Hunters come from across the nation for the upland bird, deer, and bear hunting. The Bois Brule River is one of the Midwest's favorite paddling streams. The Afterhours Ski Trail is popular with skiers across the Northland and beyond. Two small campgrounds are moderately used and complement the silent sport nature of the property. Several motorized trails link across BRSF to regional trail systems.

The Bois Brule Fishery has a great deal of history. Current management emphasizes natural reproduction and management by regulation. Notably, spawning habitat has been improved with fine results. Efforts are underway to increase the amount of woody structure in the river to improve invertebrate habitat and provide cover. Angler parking

lots are scattered near the lower river and trails connect these lots to the river, providing convenient access.

The current cover species on much of the property are beneficial to popular game species. Hunters are assisted by a system of hunter walking trails that provides easy access to favorable habitat for upland birds as well as deer and bear hunting opportunities.

Access to the river for paddling is restricted to 10 designated landings. Existing regulations prohibit glass containers, loose litter in boats, and inflatable watercraft. Enforcement of these regulations has increased and an effort is being made to educate users and develop a culture of respect and concern for the river by these users.

The Afterhours Ski Trail system offers approximately 14 miles of trails catering to both striding and skating methods. The system is well known for its exceptional grooming and the system has grown and improved through the combined efforts of BRSF and the Brule Valley Ski Club. Trail groomers from the Midwest, Canada and New Zealand have visited the Afterhours Ski Trail for advice on grooming practices. The most recent statistics show that over half of the trail's annual pass purchasers were from Minnesota, indicating distance people are willing to travel to ski here.

The campgrounds are managed mostly as self-registration, first-come-first served. The Copper Range Campground is most popular with anglers in the spring and fall. The Bois Brule Campground is most popular with paddlers during the summer months. Both are frequently used by groups of 20 to 80 people. Users value the rustic nature of the campgrounds and privacy. Rangers patrol the campgrounds, monitor self-registration and register campers on the weekends.

The Brule-St. Croix snowmobile and ATV trail, and the trail from the Tri-County Corridor to the Co-op Park Bridge make up the 34 miles of motorized trail opportunities on the forestthe BRSF. ATVs are only accommodated during the winter when the trail is open for snowmobiling. The local snowmobile club performs all maintenance and grooming on the trail. These trails are important links to other trails in the region.

An attempt is being made to develop an education program on the BRSF. A Natural Resources Educator LTE has recently been hired to work half time at canoe landings and half time preparing and presenting traditional interpretive programs. The goals of this program are to minimize conflict between varied user groups on the river, to celebrate the rich cultural and natural history of the property, and to increase public awareness of the processes that guide resource management on the BRSF.

The property also provides opportunities for hiking on the Stony Hill Nature Trail, the Old Bayfield Road Hiking Trail, the North Country National Scenic Trail, and numerous other forest roads and trails.

Current management attempts to meet the widely varied expectations of the public to provide outdoor recreation opportunities respectful of the ecological capabilities of the lands and waters.

SUMMARY OF PUBLIC INVOLVEMENT PROCESS

Involving the public in master planning for a public property like the Brule River State Forest is a complex challenge. Public input is a key element in the master planning process. The goal is to listen and gain input from a wide-range of stakeholders, in order to manage the property for a variety of users and benefits.

The Brule River State Forest master plan used a variety of techniques to inform and involve the public in the planning process:

- Written materials, including brochures, progress reports, fact sheets, resource assessments, and biological and ecological inventories were developed and distributed to provide an overview of the master planning process, property resources and use.

- Master planning team members communicated with the public by direct mail literature and correspondence, a master plan web page, telephone, e-mail and personal contact.

- Public meetings, forums, forest tours and workshops were held at key stages throughout the master plan's development. Meetings were held locally and at several times throughout the state to provide citizen interaction, involvement, and input to the planning process. This process enabled individuals, department staff, state and local clubs and organizations to work together.

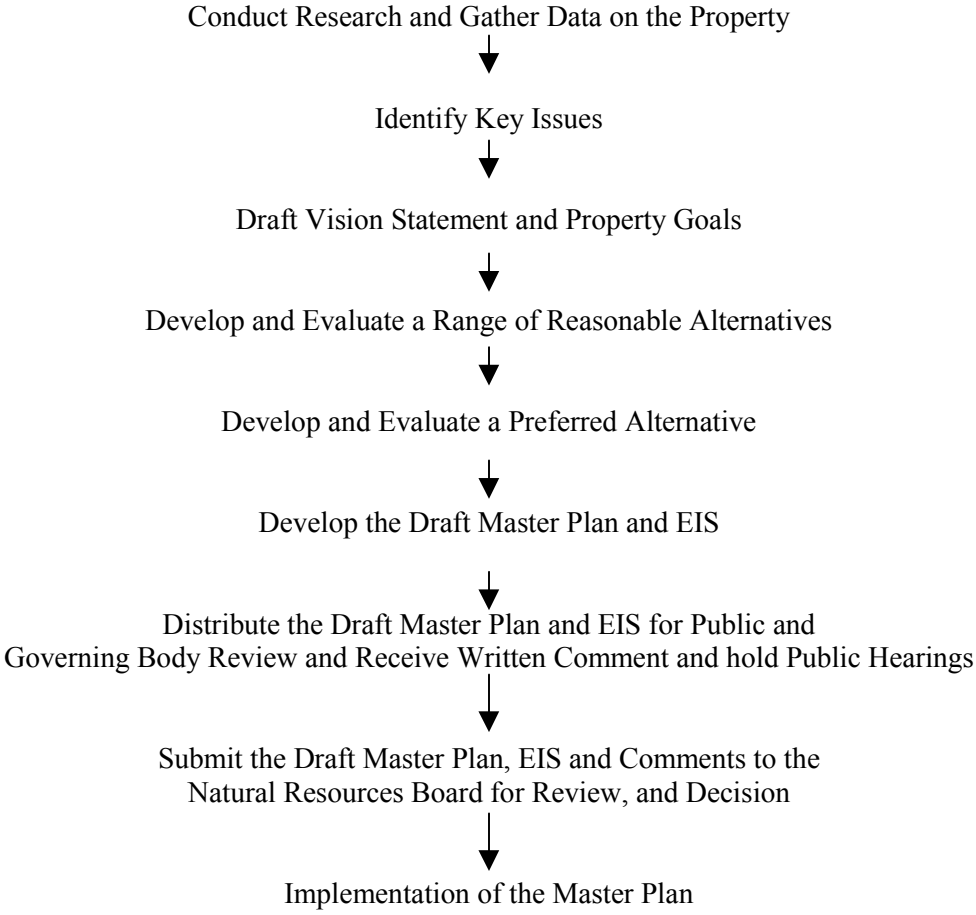
- Opportunities for involvement were announced in a variety of media sources ranging from state and local newspapers and publications, radio /television, direct mail, and the Brule Master Plan web page.

- On a government to government basis, department staff consulted directly with tribes, federal, county, state, and local governments regarding master plan objectives and alternatives.

- The Natural Resources Board and Department administrative team leadership were briefed on progress throughout the planning process.

The Master Planning Process

The following diagram depicts the planning process and the various stages in the plan's development where the Department invited participation and solicited input from the public and governing bodies.



Forest Tour, Open House and Issue Identification Workshop

On June 6, 1998 the Brule River State Forest hosted the first open house and forest tour since initiating the master planning process on BRSF. Those who attended had an opportunity to meet DNR staff and comment on various issues such as land management, recreation, endangered resources and fisheries.

Questionnaire

A Brule River State Forest "Issues Opinionnaire" was designed to see if the issues previously identified remained important, to clarify those issues, and to identify any additional issues that may have emerged. The "opinionnaire" was circulated to the public by mail and during a public meeting to gather and redefine issues.

The opinionnaire was not designed to be a quantitative scientifically designed survey or a way to vote for a particular outcome in the master plan. It was used as a tool to forecast which issues were likely to generate the most interest during planning to facilitate discussion.

Vision and Goal Workshop

With the public meeting input of October 1998, Department of Natural Resources staff began to formulate vision and goals for the BRSF. In November of 1998 tribal representatives were consulted for their input regarding vision and goals. A Vision Statement and set of Property Goals for the BRSF was drafted based on the information provided. The Vision and Goals have since served to guide the master plan's development.

Issue Forums

Informational Issue Forums were held to share and receive information and to lay the foundation for developing the management alternatives. These forums were community conversations among the various interested parties, including the DNR. The purpose of these forums was to allow an exchange of information on key topics that were addressed in the development of the alternatives. This informational exchange among DNR scientists and the public became the basis for drafting a range of alternatives and selecting a preferred alternative at a later date.

Topics for the Issue Forums included:

- Forest Ecology and Management
- Water quality, Hydrology and Fisheries Management
- Wildlife Habitat Management
- Socio – Economics
- Recreational Use and Access
- The Regional Ecology and Ecological Units of the BRSF.
- Opportunities for Community Restoration and Old growth on the BRSF.
- Rare, Threatened and Endangered Resources in the BRSF.

Alternatives Meetings

Developing draft management alternatives with the public was an important step in the process of developing a management plan for the Brule River State Forest.

As part of the master planning process Department staff developed management concepts (or alternatives), following public workshops, to represent a range of possible alternative approaches to managing the property. Four possible "Resource Management Concepts," four possible "Recreation Management Concepts" and a discussion of options regarding "Current Property Boundary and Land Areas of Special Interest" was offered. Concepts were based on ideas and comments received from the public, information in the Northern Forest Assessments and other scientific information and on the Department's experience in managing the BRSF property.

The Department's master planning rule (NR44) identifies that these drafts and the eventual management plan for a property must meet the statutory purpose of the property's designation. In this case, the property is a state forest as defined in Wisconsin Statutes 28.04.

The DNR hosted a series of public meetings to receive public input on the Brule River State Forest Master Plan- Management Alternative Concepts. Public input was considered, along with criteria such as: ecological capability, regional setting, and legal /policy constraints in the DNR's selection of a "Preferred Alternative".

Preferred Alternative Meeting

In October of 2001, the Preferred Alternative was made available to members of the public, organizations, governing bodies, elected officials and other public agencies and tribal representatives for review and comment.

Draft Master Plan and EIS Hearings

Public and tribal input on the Preferred Alternative, supporting scientific data and the regulatory requirements for the property were the foundation of the development of the Draft Master Plan and EIS. The Master Plan Core Team prepared a set of recommendations, along with relevant supporting information. Recommendations were presented to the Department's BRSF master plan Guidance Team for a decision on options to include in the Draft Master Plan and EIS.

With Guidance Team approval, the Draft Master Plan and Environmental Impact Statement was finalized and distributed for public review. Per Wisconsin Environmental Policy Act (WEPA) requirements, a public "Notice of Availability" of the Draft Master Plan and Environmental Impact Statement (EIS) was followed by a 45-day public and governmental review and comment period. A notice of EIS Public Informational

Hearings was issued at the same time as the "Notice of Availability." The EIS Public Informational Hearings were held September 10, 2002 in Brule, Wisconsin and September 12, 2002 in Fitchburg, Wisconsin. Based on comments received at the hearings, by mail/email and at the October 19th workshop, the Guidance Team determined that the plan would be submitted to the Natural Resources Board for approval with some changes to management prescriptions. The recommended changes were distributed to the public in the November 2002 BRSF Progress Report #14.

October 19th Workshop

In response to several requests, the Department of Natural Resources agreed to host a workshop for the Brule River State Forest Master Plan and EIS and expand the review period to 90 days. The public workshop was held to receive additional, more detailed public input on the Draft Master Plan, focusing on several aspects of the plan, where public opinions remain divided. Workshop participants were asked specific questions or comments they had on the Draft Master Plan (Chapter Two), and to provide any additional information when appropriate. Tentative issues were presented for discussion at the workshop that were developed based on comments received previously.

Natural Resources Board Meeting

A copy of the Draft Master Plan and Environmental Impact Statement and BRSF Progress Report #14 was provided to the Natural Resources Board members for an initial review at the same time it is distributed for public and governmental review.

NR150 describes the requirements for public review of the EIS, hearing procedures and information about the final decision. In summary, it requires the following steps. After the EIS Public Informational Hearings, and the close of the 45-day comment period, the Department prepared a summary of comments received on the Draft Master Plan and Environmental Impact Statement. This summary was submitted to the Natural Resources Board along with the final Master Plan and EIS prior to the Board meeting to consider the BRSF Master Plan and EIS for approval.

The Natural Resources Board approved the BRSF Master Plan on December 4, 2002. It becomes the document which guides and governs the management of the Brule River State Forest, until the next master plan revision in approximately 15 years. During the interim, NR44 provides a number of mechanisms, such and a "plan variance or a "plan amendment" to accommodate any minor or major changes should they become necessary.

SUMMARY OF SIGNIFICANT ISSUES ADDRESSED IN THE PLANNING PROCESS

A range of issues and topics were addressed during the planning process. Issues were identified early on in the planning process utilizing public involvement techniques previously described.

- Water quality and Fishery Management
- Ecosystem Management and Biodiversity
- Threatened and Endangered resources
- Wildlife Habitat Management
- Generation of Forest Products
- Recreational Uses (canoeing/kayaking, fishing, hunting, and cross-country skiing)
- Forest Boundary Expansion
- River Use, carrying capacity
- Education and Interpretation
- Access for recreation
- Aesthetics, scenic quality
- Land Management, Sustainable Forestry, Restoration of old growth

In general, participants responding to the Preferred Alternative displayed a high degree of interest and knowledge about the Brule River State Forest. While some differences exist among their thoughts and suggestions, it is clear that master plan participants have a strong interest in the Brule River State Forest and its natural resources.

Responses ranged from general comments, to thoughts about specific management practices, to specific comments on each of the Management Area Options. Participants seemed to agree on the desired future condition of BRSF when expressed in general terms, with many of the comments echoing the previously developed Draft Vision Statement and Property Goals. Differing philosophies remain regarding which forest management approaches to use. These range from active to passive management or a mix of the two. (For a complete summary of recent public input see Progress Report 11.)

SUMMARY OF TRIBAL CONSULTATIONS

Members of the master planning team of the Brule River State Forest met with tribal, Great Lakes Indian Fish and Wildlife Commission (GLIFWC), representing the Voigt Intertribal Task Force members. Some meetings were held along with the planning team from the Northern Highland-American Legion State Forest, Bearskin State Park Trail and Powell Marsh.

In general, tribal representatives expressed interest in all aspects of forest management and recreational activities that may impact the tribe's ability to exercise their off-reservation treaty rights to hunt, fish and gather plants in the Brule River State Forest (BRSF). These consultation with the tribes was conducted on a government-to-government basis as required under Wisconsin Administrative Code NR 44.04 (7)(c), and continued throughout the master planning process. Tribal comments and concerns were considered along with public input while developing the BRSF master plan.

Off-Reservation Treaty Rights

As part of the government-to-government consultation process, GLIFWC representatives prepared verbal and written comments at various stages of the Master Planning Process, indicated in the previous section. The input received from the GLIFWC staff and other tribal representatives were considered along with public input in the development of subsequent stages of the Master Planning Process. Typically the comments provided by the GLIFWC staff member's were authorized by the Voigt Intertribal Task Force

Areas of particular interest to tribal representatives included:

- Restoration of native communities
- Use of herbicides and other agricultural chemicals
- Monitoring and control of invasive, non-native species
- Opportunities for tribal members to hunt and fish species identified as being of special interest
- Opportunities for tribal members to gather forest plants and materials identified as being of special interest
- Maintaining tribal vehicular access to forest roads

CHAPTER TWO

MASTER PLAN

The management goals and prescriptions described in this chapter have been developed within the context of a regional landscape setting and a long-range view of ecological restoration and management. The Brule River State Forest (BRSF) exists as one small part of a larger landscape that contributes to or detracts from the various goals outlined in this plan. It is recognized that landscape level ecological goals for natural communities such as boreal forests or pine barrens cannot be achieved without a property expansion and regional cooperation with other landowners. It is also recognized that ecological restoration and management goals, particularly for forests, often cannot be met in the typical 15-20 year time frame of a state property master plan. This reality is reflected in the time frames described in the Management Area objectives. It is the intent of this plan to outline the specific steps that can be taken to contribute to the regional and long-range goals with the realization that they will not be achieved before this plan is reviewed for revision in the next planning cycle.

VISION STATEMENT

The Brule River State Forest provides for the sustainability of a unique river system and biologically rich forest community. The BRSF's natural resources are managed, protected and restored to promote ecological health and natural communities, to complement the larger ecosystem, and to recognize cultural and economic values. The state forest accommodates recreational activities consistent with the natural quality and scenic settings found along the Bois Brule River. The Department of Natural Resources (DNR) works with federal, state, tribal and local governments, neighboring industrial and private forest owners, and the citizens who enjoy and subsist on the resources of the Brule River State Forest.

GOAL STATEMENTS

- Maintain and enhance the high water quality and natural flow of the Bois Brule River.
- Provide an environment that emphasizes natural beauty and enhances a sense of solitude and quietness.
- Maintain and enhance the quality of the fishery and fishing opportunities.
- Maintain hunting opportunities on the BRSF.
- Provide and accommodate a range of land and water based recreational opportunities while protecting the natural beauty and quiet experiences.
- Use sustainable forestry practices to manage the forest resources for present and future generations.
- Maintain and restore native ecological communities and habitats.

- In consultation with tribal governments, manage the land and other natural resources to provide for the exercise of Chippewa Treaty rights, in accordance with applicable law.
- Increase educational opportunities on the forest for all users.
- Involve the public as partners in the planning and management of the forest.
- Continue to purchase private land from willing sellers that are within the Brule River State Forest boundary , as such land becomes available.

PROPERTY-WIDE MANAGEMENT OBJECTIVES

Recreation

- The specific recreation prescriptions together are intended to achieve the overall objective of recreational experience on the Brule River State Forest; rustic in nature and focusing on the use and appreciation of the natural resources of the property.
- These prescriptions are designed to support the following numbers of visits or user-days: 35,000 anglers; 45,000 paddlers; 35,000 hunters; 19,000 snowmobilers; 10,000 campers and 25,000 cross-country skiers along with smaller numbers of other users. The prescribed management, facilities and staffing levels are designed to provide the necessary support for the public use levels.

Watershed Management

- Protect and maintain instream conditions that supply all the various habitat needs for the self-sustaining multi-species fishery and other aquatic biota. The tributaries act as important spawning and nursery areas for the Brule River system fishery.
- When planning specific land management actions, state forest staff will consider the other management occurring within a subwatershed to assure watershed protection.
- Manage land resources to control peaks in overland water flow which can result instream bank erosion, particularly on the clay plain. Research related to this indicates that in a watershed with different aged forest stands and some open areas, spring snowmelt does not occur all at once. This reduces peaks in overland water flow. In addition, if more than 40% of a watershed is in forests greater than 15 years old the potential for high peak flows is significantly reduced (Verry 1986, WDNR 1995).

Land Management

The specific land management prescriptions outlined in this chapter are designed to achieve the natural community objectives outlined in each management area. Overall these prescriptions represent a property-wide average annual work objective. These average annual work objectives include:

- 120 acres of prescribed burning to maintain grassland and barren habitats
- 300 acres of thinning to manage pine plantations to more natural densities
- 15 acres of final regeneration harvest in red pine for regeneration of this forest type
- 75 acres of jack pine harvest for regeneration for this forestry type
- 150 acres of aspen/birch harvest for regeneration of these species or as part of a shift to conifers in specific areas

- 25 acres of scrub oak harvest to maintain this community type
- 15 acres of fir-spruce harvest for regeneration or to facilitate planting of additional species
- 20 acres of northern hardwood/red oak harvest for regeneration of specific species in this community type
- 60 acres of ground disturbance for regeneration of species such as white birch or jack pine
- 50 acres of planting to maintain or increase tree species such as adding white pine and white spruce to some areas or maintaining red and jack pine to other areas

PROPERTY-WIDE MANAGEMENT PROVISIONS

The following section describes general practices and polices that would be applied to all lands in the Brule River State Forest that are under state ownership.

Legal Requirements and Agreements

- There are many easements and land use agreements with various public utility companies for facilities such as power lines and gas pipelines. All existing agreements would be honored.
- A minimum-security correction facility is located on the Gordon Unit of the state forest. The Department of Corrections operates this facility on the state forest property through a long-term lease agreement with the DNR. Any expansion or modifications to the terms of the lease agreement would require a Master Plan variance or amendment per NR 44.
- Existing easements of record and land use agreements that provide access across state property to private ownership within the forest boundary would continue to be honored.
- Management activities on the state forest will follow the procedures outlined in Department Manual Code 1810.1 to assure the preservation of historic resources. Forest managers have a database available to check for known historical resources while planning all management activities. Archeological reviews are done on all construction sites.
- Use of the property by the military will be restricted to those uses that are compatible with the objectives of the master plan. Military activities are approved by a special use permit and generally include activities such as orienteering training or wilderness camping. Other activities that may occur would be cooperative training or development projects, which further the goals of the property such as trail construction or fish habitat improvement.

Endangered, Threatened and Rare Species

Three state endangered, seven state threatened species and numerous rare species of special concern were identified through inventories on BRSF. All management prescriptions in this draft management plan have considered the needs of these species and will result in no change or positive impacts to their habitat (See Chapter Three). The needs of these species have been incorporated into the management prescriptions contained in this management plan. Annual management actions being planned on the state forest are checked against an up-to-date database of listed species to assure that no department actions results in the direct taking of any known endangered or threatened resource.

State Natural Areas

The Department of Natural Resources manages a variety of property types each with a different legal purpose including state forests, wildlife areas, state parks and state natural areas. The State Natural Area (SNA) system represents the wealth and variety of Wisconsin's biological diversity. State Natural Areas are unique in that they can exist as stand alone properties or be designated within the boundaries of another property type. This Endangered Resources program works cooperatively with the BRSF by coordinating educational, monitoring and research activities. Management goals are identified in the master plan and any additional restrictions on visitor use that may be needed to protect unique natural resources would be found in NR 45. The designation of the State Natural Areas within BRSF boundary does not change the property designation. The importance of State Natural Areas has been recognized on the Brule River State Forest by designating nearly 4,000 acres or 10% of the state forest for SNA sites. (Refer to the State Natural Area map in the Maps Section at the back of this Document)

Tribal Consultation

In consultation with tribal governments, manage the land and other natural resources to provide for the exercise of Chippewa Treaty rights in accordance with applicable law.

Health and Safety

Within designated use areas such as campgrounds, picnic areas, parking lots, and high use trail systems, trees or other natural elements that are deemed as hazards to those using these areas would be identified and removed. All facilities will comply with federal, state, and local health and sanitation codes; such as well testing, campground licensing and wastewater treatment.

Herbicide Use

The public and tribes will be informed as to the areas where herbicide will be applied, at the BRSF annual meeting and in literature. This literature will be provided to a designated Tribal representative and additional information will be provided upon request.

State Forest Road Access

All state forest roads that are open to public vehicle access are restricted to use by street licensed vehicles only. Some forest roads are maintained open continuously; particularly where necessary for fire suppression. These permanent roads are maintained open unless there is evidence of resource degradation. Evidence of resource degradation is normally associated with unsafe conditions for public vehicle access.

State forests, including the Brule River State Forest, regularly open and close forest roads as needed to conduct prescribed management. On the BRSF new roads are rarely constructed, but closed roads may be reopened. Roads opened for management purposes are generally open to the public during the management period (one to two years) and a short time thereafter to allow access for firewood collection or other uses. Following this period they are closed by gating or berming. The same general miles are open to public vehicles across BRSF over time, but in different locations. This variable condition represents the historic use availability for public and tribal access. Road

access for the disabled is provided for on a case-by-case basis by permit from BRSF Superintendent.

Disabled Accessibility

All new construction and renovation of facilities would follow guidelines set forth within the Americans with Disabilities Act (ADA), and the recommendations of *the Brule River State Forest- Accessibility Review, December16, 1999.* Specific requests for reasonable accommodations can be directed to the state forest superintendent for a special use permit.

Forest Pest Control

As stated in Wisconsin Statutes 26.30, "It is the public policy of the state to control forest pests on or threatening forests of the state…" Within the Brule River State Forest significant forest pest events will be evaluated with consideration of the property management goals and the potential threat of the pest to other landowners. Responses to significant infestations may include timber salvage or pesticide treatments. Any response to a significant pest outbreak will be evaluated by an interdisciplinary team of scientists and communicated through press releases and notices to interested parties.

Emergency Action Plan

The property maintains an emergency action plan that describes staff response and coordination with other agencies to natural disasters as they affect public safety and facilities. This plan is reviewed on an annual basis for possible revision. Department responses to natural resource impacts from natural disasters are determined by specific interdisciplinary evaluations following such an event.

Fire Suppression

As stated in Wisconsin Statutes 26.11, "The Department is vested with power, authority and jurisdiction in all matters relating to the prevention, detection and suppression of forest fires outside the limits of incorporated villages and cities in the state except as provided in sub (2), and to do all things necessary in the exercise of such power, authority and jurisdiction." Forest fire suppression actions within the state forest will consider the property management goals and the threats of the fire to life and property. Appropriate techniques will be used in each event that provide effective fire suppression while minimizing resource damage.

Historic Trails and Trail Easements

The Tri-County Corridor Recreational Trail connects the City of Superior to the City of Ashland and passes through BRSF boundary but is not an easement or part of the state forest. The state forest does not manage this trail system; therefore the management of this trail is outside the scope of this master plan. The North Country Trail is administered through the National Park Service and runs from Maine to North Dakota. The state will continue to honor our cooperative agreement with the National Park Service to allow this trail to cross a segment of the state forest.

Municipal Jurisdiction within the State Forest (County and Township roads)

There are numerous state, county, and town roads within the state forest boundary but outside the jurisdiction of this master plan. These roadways would continue to be managed outside the scope of this master plan for the BRSF. Local road officials will be encouraged to follow Wisconsin's Forestry Best Management Practices for Water Quality (BMPs) while managing municipal roads.

Scenic Resource Management

This management plan has been developed to favor many of the scenic values that were highlighted during the master planning process. Where the specific management has not been designed to address scenic values in a management area, aesthetic management guidelines would be followed as outlined in the DNR *Silviculture and Forest Aesthetics Handbook*- 2431.5 would be used as a minimum (Sloan 1986). This handbook provides guidance for minimizing the visual impact of vegetation management, timber harvest and slash management along will traveled roads, trails and waterways. Scenic resource goals are considered along with other goals such as ecology, water quality, rare species and public safety in every action planned on the state forest.

The aesthetic character of the Brule River and developments adjacent to the river are of high value to many of the state forest users and neighbors. Wherever feasible the development of facilities on the property will blend with the surrounding landscape and reflect the architectural character of the CCC era (log construction for buildings, roundwood for signs and kiosks, etc).

Water Quality - Best Management Practices

All management activities within the state forest would follow, as a minimum standard for all management, use best management practices (BMPs) for water quality as outlined in *Wisconsin's Forestry's Best Management Practices for Water Quality, A Field Manual for Loggers, Landowners and Land Managers,* DNR publication PUB-FR-093-95. In most cases, forest management practices exceed the minimum BMPs.

Big Tree Silviculture

Big tree silviculture as applied on the Brule River State Forest would include management of primarily pine covertypes on sites that are capable of growing large diameter trees, as described in Chapter 11 of the *Silviculture and Forest Aesthetics Handbook*- 2431.5. (Sloan 1986)

Region-wide Natural Resources Management

The Northwest Sand Barrens Management Group is a group that consists of a broad range of land managers and scientists from local, state and federal governments, and university staff that have identified regional management issues within the Bayfield Sand Plain. As a part of this ecological region, the Department will continue dialogue with this group regarding how the management of the BRSF relates to these regional issues. As other regional groups develop, the state forest will continue to cooperate with them beyond the state forest's boundaries using a landscape approach.

Invasive Exotic Species Control

The removal of Scotch pine, Norway spruce and European larch would occur over time. If ever detected on state lands, invasive exotic plants such as common and glossy buckthorn and purple loosestrife would be controlled. Other invasive exotics, if ever detected, such as spotted knapweed and zebra mussels would be dealt with if appropriate and effective methods are available.

Deer Population Management

The Brule River presents a dilemma to deer management. The forest type and the plants of concern are located in areas that naturally concentrate wintering deer. This is compounded by the popularity of feeding deer for recreational viewing on private lands within BRSF boundary. The long linear shape of the forest and its use as a wintering area would require management of deer populations occurring well beyond the state ownership boundaries. To effect changes in deer population management goals or feeding practices, concerned citizens, tribal representatives, forest managers and ecologists must be involved with the separate rule making processes that address these specific issues. Deer population goals are set through the statutory review processes used every 3-5 years to set population goals. During the last review process the goal was reduced from 20 to 18 deer per square mile of range for the over-winter deer density.

Fishing Regulations

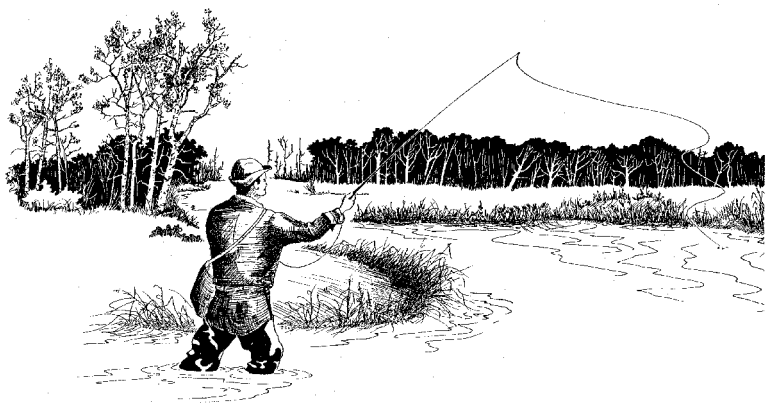
The establishment or modification of fishing regulations occurs in a process separate from the master plan in accordance with NR 20.

Non-Metallic Mining

Sand or gravel used for property management will come only from existing disturbed areas and will be in areas smaller than one acre.

Funding Constraints

The ability to implement any master plan element would depend on the budgetary authorization granted to the Department of Natural Resources by the Wisconsin legislature and the Governor.



REAL ESTATE MANAGEMENT

Purpose

The Department of Natural Resources administers an active land acquisition program for the purpose of protecting water resources, managing forests, providing wildlife and endangered resource habitat and providing outdoor recreational and educational opportunities for all citizens. Acquisition of property within key project boundaries such as the Brule River State Forest (BRSF) provides resource managers with the necessary land base to implement specific natural resource and recreation responsibilities. These lands are held in trust for the public to enjoy for fishing, hunting, hiking, sightseeing, bird watching, boating, swimming, outdoor education and numerous other public benefits. The 1979 master plan project boundary of the Brule River State Forest included approximately 50,000 acres, with about 41,000 acres are under state ownership.

Real Estate Acquisition Policies

Properties in the Brule River State Forest Boundary are acquired only under a willing seller / willing buyer agreement, or by donation. Department staff maintains a listing of all private landowners within the project boundaries. Contact is made with these landowners at least once every three years in order to explain the status of the acquisition program in BRSF. The Brule River State Forest acquisition plan emphasizes priority on acquisition of large tracts of undeveloped lands, parcels with water frontage, environmentally / ecologically sensitive areas and parcels for future recreation sites. This is accomplished by fee purchase, purchase of scenic easements, exchange, donation, or conservation easements.

There are some areas within BRSF Boundary that the Department would not pursue acquisition, such as, within the limits of the Village of Brule. Also, the Department would not pursue acquisition of land where certain circumstances may exist that may render a property undesirable, such as an abandoned dumpsite that may present a liability for hazardous materials. Acquisitions are subject to the approval of the Natural Resources Board and the Governor. If either of them reject the option, the Department cannot acquire the property.

Cooperation with Adjacent Property Owners

The Department will continue to pursue cooperative management of land with private landowners within the Brule River State Forest project boundary. The opportunity for the DNR to cooperate with other landowners in the management of adjacent lands is also extremely important to the future health of ecological systems within BRSF. The Bois Brule watershed consists of an approximately 195 square mile area that extends well beyond the boundary of the Brule River State Forest. The Bois Brule River system was included in NR 102.10(1)(d) as a "system" under Class I trout streams. The entire river and all of its tributaries, and their tributaries are considered "outstanding resource waters." Thus, land use decisions by jurisdictional governing bodies or agencies, concerning areas outside of the state forest boundary - deserve careful consideration - for any potential impact on the water quality of the Bois Brule River system.

Implementation of the master plan would include on-going communication with the municipalities, county governments, county foresters, land trust organizations, industrial forest owners and private property owners, paying particular attention to the protection of the water quality within the watershed. DNR staff would work to encourage stewardship of the lands, particularly in the Bois Brule watershed and the identified sub-watersheds, which drain into the Brule River. (Refer to the Bois Brule River Watershed map in the Maps Section at the back of this Document) Whenever possible, the Department will consider alternatives to direct public purchase, such as; the purchase of easement rights (i.e. scenic, development or management rights), or voluntary cooperative management agreements with private landowners.

The 1979 Master Plan Project Boundary

The 1979 master plan project boundary of the Brule River State Forest (BRSF) was designed to encompass the mainstem of the Brule River. For this reason the property is about 26 miles long and two miles wide and includes an eight-mile long strand of public ownership along the Lake Superior shore. The 1979 master plan project boundary included an approximate acquisition goal of 50,000 acres. Of this total, approximately 41,000 acres are in state ownership and 9,000 acres remain in private ownership.

The prospects of the Department acquiring these remaining private lands will take many more years to achieve. It is important to note that the Department will continue to pursue cooperative management of land with private landowners within the Brule River State Forest project boundary. In addition, there are several areas along the lower river and the upper lakes and springs with significant private ownership within BRSF boundary. *The Department policy is to purchase land from willing sellers within the established project boundaries*. The availability of land acquisition funds and the willingness of landowners to sell determine how much land is purchased any given year. In the case of the Brule River State Forest, one of the DNR's older properties, the State has been acquiring land for almost 90 years.

Expansion of the 1979 Master Plan Project Boundary

This master plan expands the current boundary at the northern and southern areas of the property. These areas are to be included in the state forest boundary because they impact on and make significant contributions to regional open space, link regional biological corridors, have important ecological restoration potential, help protect the watershed and lakeshore, and provide recreational opportunities. The areas included in the northern and southern boundary expansion areas are approximately 7,000 acres and 25,000 acres, respectively. These lands would be included in the State program for payment in lieu of taxes so that local governments would continue to receive revenue from these lands. These expansion areas increase the project boundary from 50,000 to about 82,000 acres. These two areas are outlined by green dashed line on the attached Land Management Classification Map (Refer to the Maps Section at the back of this Document) Listed below are some of the reasons for evaluating these areas and some of the potential benefits:

Northern Boundary Expansion Area

The northern forest boundary expansion is enclosed by Jack Pine Road on the west and along the south it follows a line from Snowmobile Alley to Balsam Bend Road. The boundary then travels south on Balsam Bend Road to HWY 13 and returns east to the existing boundary at Clevedon Road. The expansion area includes the property east and north of this line. The northern boundary expansion also includes the area between the current eastern boundary and the county line that is north of Trails End Road. (Refer to the Maps Section at the back of this document – Land Management Classification map). The expansion area is located in the Townships of Cloverland and Lakeside. If acquired, this would add approximately 7,000 acres to the state forest. About 80% of the parcels in this area that are not currently owned by the state of Wisconsin are undeveloped industrial forestlands and much of that land is contiguous to the existing state forest.

This ownership would be an important addition the Brule River State Forest for the following reasons:

- It would allow a functional landscape scale restoration of a clay plain boreal forest, a rare ecological community in Wisconsin.
- It provides the potential to preserve a natural and remote recreational setting along Lake Superior.
- To protect additional watersheds that flow into Lake Superior
- It provides the potential for a large-scale demonstration of silvicultural practices for boreal forest management.

If acquired, this area would be managed similar to the Area 1 - The Lake Superior Clay Plain-Native Community Management Area. (Refer to the Maps Section at the back of this Document – Land Management Classification map)

Southern Boundary Expansion

The southern boundary expansion area is approximately 25,000 acres in size. The expansion area begins at the St. Croix Picnic area and heads south to CTH A. It then follows the highway east to the county line and then runs north to the current property boundary. The southeast area of the southern boundary expansion excludes approximately 1,600 acres south of Cheney Lake and northwest of HWY 27. The southern boundary expansion area is located in the Townships of Highland and Solon Springs. Approximately 90% of this area are large blocks of undeveloped industrial forest ownership.

Young red pine plantations dominate the southern boundary expansion area. Several small undeveloped lakes are also located within this area. Many miles of rustic town roads and various logging trails cross this area. A snowmobile trail that connects the Village of Brule and Solon Springs leaves the state forest land in this area and runs across private land.

This ownership is an important addition the Brule River State Forest for the following reasons:

- It would allow a landscape scale restoration of the globally rare pine barrens ecosystem and would permit more extensive use of controlled burning through use of permanent firebreaks.

- It would help secure populations of grassland/barrens wildlife in the region, including sharptail grouse.

- It would provide important open-space and recreational links to other public lands in the region including the potential for new trails and campgrounds assuring the long term presence of the existing snowmobile trail.

- It would provide long-term protection for small lakes (5 to 40 acres) in a more wild and remote setting than found in the rest of BRSF.

- It would provide long-term protection of watershed and a major recharge area for the artesian springs that create the unique cold water fishery of the Bois Brule River.

- It would help secure important open-space and recreational links to other public lands in the region.

If acquired, this area would be managed similar to Area 10- Pine Forest and Barrens- Native Community Management Area.

Implementation of Real Estate Management

The Brule River State Forest acquisition emphasizes priority on acquisition of large tracts of undeveloped lands, parcels with water frontage, and parcels for future recreation sites. This is accomplished by fee purchase, exchange, donation or conservation easements. To maintain an effective acquisition program, the Department pursues properties based on the level of interest of the seller.

The acquisition cost of land in the property boundary area would be based on the "fair market value" at the time of purchase. The fair market value of a particular property would be established through an appraisal process that is based on the sale price of compare properties and factors in variables, such as, property improvements, lake or river frontage, the topography, the soils, the existing vegetation / timber value, adjacent land uses, etc.

PUBLIC COMMUNICATION PLAN

The State Forest Superintendent will be the Department representative responsible for communicating the goals and management of BRSF as well as answering questions from the public regarding land management, recreation and law enforcement. The property manager will maintain a mailing list of persons or groups interested in receiving information about important management issues on the property. Mailings and news releases may be used to notify the public of significant developments on the property.

The annual winter public meeting held to describe management plans for the coming year will continue to be held to inform the local public. An additional Fall public meeting will be held to discuss with the public on other issues. The Department and interested public can explore options such as cooperative projects, increased resources or if necessary, follow master plan variance, amendment, or revision procedures as described in Chapter NR 44, Wis. Admin. Code in order to address needs that arise from these meetings. As the Department continues to work with local citizens on user group conflicts we will adapt our techniques of public involvement to best solve the problems at the time.

SUMMARY CHART OF MASTER PLAN

The following chart provides a general summary of the management objectives and activities prescribed for each management area within the Brule River State Forest (BRSF). On December 4, 2002, the Natural Resources Board (NRB) approved the Brule River State Forest Master Plan and directed DNR staff to prepare a summary of the master plan which could be used as quick reference to the management prescribed on the state forest. The BRSF property management must be consistent with the BRSF Master Plan as adopted by the NRB. The summary represents the Department's best interpretation of how the Master Plan should be implemented.

The intent of this summary is to provide interested parties with a general idea of the management activities that may be seen during an average year and the BRSF Master Plan objectives that those actions are intended to meet. The summary does not contain a detailed description of the ecological or recreational context or anticipated impacts of these management actions, but provides page references so the reader can find this additional information within the Master Plan. Management on state forests is prescribed based on achieving future desired forest conditions and recreational settings and this management is adjusted based on regular scientific monitoring of forest vegetation and other resources. The summary numbers presented in these charts and the Master Plan are therefore approximate because numerous annual factors can alter the anticipated growth and development of forest characteristics or recreation demands and issues. In response to these changes, the Department uses an adaptive management approach that involves input from multiple scientific disciplines within the Department to continue working toward the future desired condition. That approach will be consistent with these summaries.

The Department does not manage state forests based on production quotas or limits with respect to forest products generated through timber harvests. Therefore, the numbers presented in the summary chart should not be viewed as absolute annual management goals but rather as estimates of management activities based on the current forest condition and desired future forest condition. There will be annual variation in management activities. Nevertheless, the Department does not expect any significant changes to the summary numbers without a plan variance or plan amendment.

Department rules allow the Department or any person to seek NRB approval for a proposed Master Plan amendment or variance (See, Ch. NR 44.04 (6), Wis. Admin. Code). The Department will seek such a variance or amendment prior to conducting any activities that are outside of the scope of the authorized management activities delineated in the master plan or this summary.

The Department will conduct at least 2 public meetings annually to inform and seek public input on the state's activities in the BRSF. The State Forest Superintendent will provide public notice through news releases or other methods announcing these meetings at least 15 days in advance of the meetings. The meetings will include a report on the state's recent activities and its plans for near future activities, including plans for thinning and harvesting, prescribed burning, planting,

and a description of how those activities relate to the Master Plan objectives. The Department will take public comment at those meetings and will also receive written comments for 15 days following the meeting. The Department will consider those comments in its final decision on planned activities and modify activities, when appropriate, to address issues raised in dialogue with the public.

Area 1 – Superior Clay Plain – Native Community Management

Approximately 11,800 acres; northern expansion potential of 7,000 additional acres

See page 56

Management Objectives

- Boreal Forest:
  Manage the upland forest toward a dominance (greater than 50% of Area 1) of white spruce, white pine, and white birch, along with common associates including white cedar, balsam fir, aspen, red pine and upland tamarack.

- Manage several conifer-dominated areas passively and monitor as reference areas. Management actions will be considered in cases of exotic plant control and public safety needs.

- Reduce aspen from 4,100 to 2,500 acres over 50-100 years; increase conifer covertypes; manage for areas of old growth characteristics.

- Maintain areas of existing grassland (800 acres total) south of Brule River Road within this management area in an early successional grass and shrub cycle of management.

What would you see in an average year?

- Harvest will not be seen from the Brule River.
- Passive Management will be used in the majority of this area during the life of the plan including in 3 locations specifically identified in the plan; Brule River Boreal Forest State Natural Area, Bear Beach State Natural Area and the Bracket's Corner site for a total of 767 ac. Among the additional lands to be passively managed include those along streams, some roads and research sites.
- Special aesthetics guidelines along roads will continue.
- Over the 15-year period of this plan approximately 3-4% of the area will be thinned or regenerated through timber harvesting. On average, there will be 2-4 harvests each year of between 2 and 10 acres per area. A total of approximately 25-30 acres will be harvested in an average year. Harvests will include the following:
  - Aspen/white birch. On average, conduct 1-3 aspen/white birch harvests of between 2 to 10 acres per harvest area to favor conifers and white birch. On average 20 acres will be harvested each year. Harvests will be irregular clearcuts or group selection that are designed to encourage an increase in conifers.
  - Balsam fir and other conifers. Conduct primarily shelterwood or selection harvests of between 2 and 10 acres per area of balsam fir or other conifers to facilitate regeneration or planting of white pine or white spruce. On average a total of about 5-10 acres per year of balsam fir and other conifers will be harvested.
- 1-2 plantings per year of primarily white pine or white spruce
- 1 prescribed burn or ground disturbance of about 10-20 acres every 3-5 years to facilitate conifer or white birch regeneration.
- 3 prescribed burns, haying or mowing/brushing blocks per year totaling about 60 acres for grassland maintenance.
- Conduct occasional earthwork for drainage and water level manipulation on existing wetland impoundments.

Bear Beach State Natural Area: (103 acres) protect Lake Superior beach and banks from unnatural erosion; remove exotic species; no timber harvest or salvage Brule River Boreal Forest State Natural Area: (652 acres) closed canopy forest; remove exotic species; no timber harvest or salvage; monitoring

Area 2 – Sugar Camp Hill/Lenroot Ledges – Native Community Management

Approximately 2,000 acres

See page 63

Management Objectives

- Develop a primarily closed canopy, managed old-growth, northern hardwood native mixed species; with some areas dominated by conifers (balsam fir, white spruce, white pine).
- Forest aesthetic qualities will be conserved and enhanced.
- Maintain red oak by encouraging regeneration of this species.
- Increase fir-spruce and white pine in select areas.
- Decrease the covertype of aspen.

What would you see in an average year?

- Harvest will not be seen from the Brule River. Passive Management will be used in the majority of this area during the life of the plan. Among the lands to be passively managed include those along streams, some roads and research sites.
- Special aesthetics guidelines along roads will continue.
- 1 small (<5 ac) prescribed burn or ground disturbance action on a 3-5 year interval for red oak regeneration.
- Over the 15-year period of this plan approximately 9% of the area will be thinned or regenerated through timber harvesting. On average about 12 ac will be harvested per year. Harvests will include the following:
    - Aspen. Every 3 to 5 years, conduct 1-2 small irregular-shaped aspen group selection or clearcut blocks of between 2 to 10 acres per harvest to encourage growth of northern hardwood and conifer species. A total of about 50 acres would be harvested over the 15-year period of the plan.
    - White pine/spruce fir. Every 3 to 5 years, conduct 1-2 selection or shelterwood harvests of between 5 to 15 acres per harvest in white pine or spruce-fir for regeneration and release. A total of about 30 acres would be harvested over the 15-year period of the plan.
    - Oak. Every 3 to 5 years and in conjunction with a good acorn crop year, conduct 1-2 harvests of between 2 and 5 acres per harvest of red oak to encourage oak regeneration. A total of about 15 acres will be harvested over the 15-year period of the plan.
    - Northern hardwoods. Every 3 to 5 years, conduct 2 harvests of approximately 10 acres per harvest area of northern hardwoods to maintain species diversity in this community type. A total of approximately 80 ac acres will be harvested over the 15-year period of the plan.
- Occasional planting of white pine or white spruce would occur based on monitoring or natural regeneration responses and site specific conditions.

Area 3 – Miller Road / CCC Square – Habitat Management

Approximately 2,000 acres

See page 67

Management Objectives:

- Continue to provide for high quality habitat for game and non-game wildlife species.
- Manage riparian forests along stream corridor slopes to promote conifer cover and to retain large woody debris with the primary goals of soil protection and maintenance of fish habitat.
- Manage for regeneration of aspen as the dominant forest covertype.
- Increase the diversity of conifer and hardwood species as secondary types.
- Maintain existing wildlife openings/wetlands.

What would you see in an average year?

- Harvest will not be seen from the Brule River.
- Passive Management in some areas for aesthetics.
- Special aesthetics guidelines along roads will continue
- Over the 15-year period of this plan about 32% of the area will be thinned or regenerated through timber harvesting.
  - Conduct 2-3 clearcut harvest and/or ground disturbance blocks per year for a total of 40 ac to maintain aspen and white birch.
  - Use harvest design and leave trees in order to encourage bur oak, black ash, white spruce, white pine, white birch, and balsam fir for greater stand diversity.
  - Conduct thinnings, shelterwood, group selection or selection harvests of existing spruce-fir and pine stands for about 5-10 ac every 3-5 years.
- No timber harvests on the slopes of stream corridors, except as necessary to maintain safety and control invasive exotic species.
- 1 prescribed burn on a 3-5 year interval to maintain grassland and wetland sites.
- Conduct small areas of moving or brush control to maintain grass/wetland areas.
- Occasional earthwork for drainage and water level manipulation on existing wetland impoundments may be needed.
- Maintain forest openings by mowing.
- Occasional planting of white pine and white spruce. depending on natural regeneration and seed sources.

Area 4 – Bois Brule River – Scenic Management Area

Approximately 5,200 acres

See page 74

Management Objectives:

Scenic River Corridor:

- Maintain the natural scenic quality of the river with an older conifer dominated forest corridor.
- Maintain the approximately 35 acre "Brule River Marsh and Lagoon" complex in a healthy natural condition with no further developments.

Eastern Border Forest:
(about 500 acres)

- Develop a forest of older trees dominated by conifer species to promote a scenic setting between the river corridor and the public roads.
- Increase the covertype of white pine and fir-spruce by 50%.
- Establish white pine, white spruce and white cedar in areas lacking these species.

What would you see in an average year?

Scenic River Corridor:

- No ongoing active management (timber harvest/ground disturbance) will occur within this corridor. The corridor is shown on the Land Management map. The only timber cutting that will occur along the river will be done to provide a safe and scenic experience to users of the forest and river.

Eastern Border Forest:

- The Eastern Border Forest is from the top of the slope of the river corridor area, east to HWY H.
- Over the 15-year period of this plan approximately 2% of the area will be thinned or regenerated through timber harvesting. On average, less than 10 acres per year will be selectively harvested or thinned. The aforementioned estimate includes treatments to all cover types across the management unit. Harvest activities will include the following:
  - Aspen/Mixed stands. Every 3-5 years, conduct 2-4 harvests of 5-10 ac per harvest area through patch cuts, shelterwood or selective harvests of aspen and other species to favor conifers, increase white pine and white spruce or to facilitate planting.
  - Timber salvage will be conducted if deemed necessary to maintain a safe/scenic experience along HWY H.
  - Pine. Once during the 15-year life of this plan, a 12-acre plantation will be thinned once. Occasional planting of white pine or white spruce depending on natural regeneration and seed sources.

Brule Fishery:

- Provide a high quality, naturally reproducing and self-sustaining trout and salmon fishery.
- Identify sites for habitat restoration or improvements.
- Continue to control beaver populations on the tributaries.
- Conduct Hilsenhoff Biotic Index for Water Quality monitoring every 3 years.
- Conduct stream bank stabilization.
- Conduct stream substrate maintenance.

Area 5 – Brule River Bog and Spillway – Native Community Management

Approximately 6,300 acres

See page 84

Management Objectives:

- Maintain a high quality forest and shrub wetland system for ecological, water quality, and habitat values.
- Develop and maintain a natural upland forest on several ridges located within the area near the headwaters of the East Fork of the Brule. Restore forest to areas damaged by the 2000 hail storm.
- Protect the water quality of wetlands, springs, spring ponds and streams within the management area.
- Conduct research on the aquatic community, forest composition/regeneration and exotic plants.
- If significant evidence of exotic plants is found, implement control activities.

What would you see in an average year?

- No harvesting in the Brule Bog.
- Over the 15-year period of this plan 0% of the area will be thinned or regenerated through timber harvesting.
- Only one small area of pine plantation now exists due to the hail damage cuts. This small (less than 20 acres is left) plantation will need thinning again in about 18 years.
- No pine plantation thinning is expected during the 15 year period of this master plan.
- Plans are to replant one 80-acre plantation with 75% red pine and 25% white pine. The ground will be prepared for planting with scarification.
- Follow-up management on newly seeded areas will be needed to release pines from competing vegetation within the 15 years of this master plan. Thinning type activities will not take place until pines are 25 years of age or older.
- Conduct exotic plant control activities where necessary and practical.
- Hazard tree removal and salvage harvests will be conducted if deemed necessary to maintain the scenic nature and provide for public safety only if they will not impact the ecological integrity of the area.
- Maintenance of existing public use areas.
- Development activities necessary for stated improvements to public use facilities.
- Monitoring and research activities.
- All authorized fish management actions and prescriptions, as described in Area 4-Fish Habitat Management, are authorized and prescribed for Area 5 as well

Brule Glacial Spillway State Natural Area: (2,509 acres) Control invasive, exotic species; No timber harvesting; tree removal only for safety reasons; fisheries management allowed; monitoring of forest cover and associated vegetation

Area 6 – Afterhours – Recreation Management Area

Approximately 2,000 acres

See page 88

Management Objectives:

- Maintain a scenic and diverse forest of conifers and hardwoods
- Emphasis on older northern hardwoods, red pine and white pine

What would you see in an average year?

- Over the 15-year period of this plan about 2% of the area will be thinned or regenerated through timber harvesting.
- Every 3 to 5 years, complete small scale management actions for a total of 5-10 acres.
- These actions are designed to encourage the establishment and growth of a mixed pine and hardwood forest of larger trees.
- Management actions will include small (2-5 acre) shelterwood harvests, selective harvests, and thinnings.
- Planting may be done as a follow-up where necessary.
- Maintenance of existing public use facilities and trails

Area 7 – Administrative Area – Special Management

Approximately 400 acres

See page 90

Management Objectives:

- Maintain the structures and facilities in this area that provide functions such as forest headquarters offices, customer service to the public, garages, equipment storage and maintenance.
- Develop additional educational opportunities and customer services in association with the existing building complex.
- Maintain a pine forest community dominated by large pines.

What would you see in an average year?

- Over the 15-year period of this plan about 10% of the area will be thinned or regenerated through timber harvesting.
- Occasional thinning (once every few years) of existing pine stands and additional management as necessary to assure pine regeneration.
- Maintenance of administrative areas.
- Increase educational opportunities through educational facilities.
- Removal of diseased and damaged trees.

Area 8 – Troy Pit Pines – Forest Production Area

Approximately 6,500 acres (*See page 91*)

Management Objectives:

- Restore and maintain dry pine forest community with areas of hardwood species
- Protection of Rush Lake through SNA management practices in Appendix J of the plan; protection of Kurt's Deep Depression through passive management.
- Maintain a late successional red pine forest at Devils Hole Pines
- Increase pine barrens and jack pine covertypes
- Maintain aspen and white birch levels
- Decrease red pine and scrub oak acreage
- Maintain white pine as a component throughout area

Rush Lake State Natural Area:
(25 acres) protect the beach from vehicular traffic; allow natural water level fluctuations; no chemical treatment or stocking of lake with non-native fish; research interior beach community

What would you see in an average year?

- Harvest will not be seen from the Brule River.
- Passive Management will be used in the majority of this area during the life of the plan including in 2 locations specifically identified in the plan; the Rush Lake State Natural Area which is all aquatic and wetland habitat and Kurt's Deep Depression which is a 33 ac area of dry pine and wetland habitat. Among the additional lands to be passively managed include those along streams, some roads and research sites.
- Special aesthetics guidelines along major roads will continue.
- This Management Area is separated from the Area 5 and the Brule River by HWY 27 and several rolling hills. Management actions in this area will have no impact on the river or bog.
- Over the 15-year period of this plan approximately 37% of the area will be thinned or regenerated through timber harvesting. Harvesting activities will include:
  - Aspen and white birch. On average, conduct 1-2 block harvests of aspen and white birch of between 10 and 20 acres per harvest for about 20 acres per year to maintain acreage in these types.
  - Red pine. On average, thin 2-4 blocks of red pine of between 20 and 50 acres per event for about 90 acres per year to manage these forests to a more natural density.
  - Oak. On average, conduct 1-3 harvests of oak between 5 and 15 acres per harvest area for about 15 acres per year to maintain some of this community. About 1/3rd of these acres will be converted to jack pine through planting/direct seeding.
  - Jack pine. The harvest acreage for jack pine would be about 30 ac per year but harvests will likely be larger and less frequent which is similar to historic disturbance. About every 3-5 years 1-2 clearcut harvests of 30 – 120 ac per harvest area will be conducted to maintain this community type.
  - 1 prescribed burn on a 3-5 year interval; about 50 acres for each burn event to manage for barrens and jack pine.
  - White birch and white pine types will be encouraged to occur within and adjacent to oak and jack pine harvest areas through soil scarification.
  - Open areas not suitable for barrens management, sites with failed regeneration, and selected scrub oak stands will be planted with jack pine following mechanical site preparation. This will occur on 1-3 sites for about 25 acres per year.
  - Depending on site conditions and success of natural regeneration some planting of red and white pine may also be done.

Area 9 – Hazel Prairie Pines – Forest Production

Approximately 4,000 acres

See page 96

Management Objectives:

- Restore and maintain dry pine forest community with patch of hardwood species.
- Terrace areas managed for old growth.
- Increase jack pine and white pine.
- Maintain about 800 ac overall of aspen as breaks to the fire prone pine types. About 200 ac of aspen will be gradually converted to pine types.
- Maintain current levels of red pine, northern hardwoods, oak, grass/upland brush and white birch.

What would you see in an average year?

- Harvest will not be seen from the Brule River.
- Passive Management will be used in the majority of this area during the life of the plan. Among the lands to be passively managed include those along streams, some roads and research sites.
- Special aesthetics guidelines along major roads will continue.
- This area is in the flat to rolling topography west of the Brule River Valley. Management actions in this area will have no impact on the Brule River or bog.
- Over the 15-year period of this plan approximately 34% of the area will be thinned or regenerated through timber harvesting. Harvests will include the following:
  - Aspen, white birch and other hardwoods. On average, conduct 1-2 clearcut harvests of between 10 to 20 acres per harvest area for an average total harvest of about 20 acres per year. Also apply ground disturbance to maintain existing levels of birch.
  - Red pine. On average, harvest by thinning, selection or regeneration 2-4 blocks of red pine of between 15 and 35 acres per harvest for about 70 acres per year.
- Jack pine within this mgmt unit is now primarily very young due to the hail storm. Follow-up monitoring of regeneration success will be done and replanting will be done if necessary.
  - Maintain a mosaic of 200 acres of grass openings and upland brush areas, primarily within natural frost pocket areas. These areas will not be planted and may be treated with prescribed burns as needed. Prescribed fire or mechanical ground disturbance may be used as follow up treatments to increase pine regeneration or prepare for planting.
  - Continue to replant a mix of jack pine, red pine and white pine in the hail damaged areas. Several hundred acres will be planted in both 2003 and 2004 with standard methods that assure the best survival. Following these plantings, additional planting may be done to convert aspen areas to pine or to follow up on areas of poor survival. Hand or mechanical control of shrubs may be conducted to increase survival of seedlings. Mixture of conifers will be planted within the terrace area and primarily red pine will be planted further away from the river. Total planting acreage will be around 200-300 acres between 2003 and 2006, then tapering off to about 10 acres averaged per year.

Area 10 – Pine Forest and Barrens – Native Community Management

Approximately 6,800 acres; southern expansion potential of 25,000 acres

See page 99

Management Objectives:

- Restore and maintain a mosaic of native natural communities that ranges from open pine barrens to dry pine forest
- Increase acreage of pine barrens and jack pine
- Maintain 100 of the present 150 ac of aspen acreage
- Maintain 500 of the present 750 ac of oak acreage
- Thin existing red pine plantations and convert some to jack pine or barrens.

Mott's Ravine
State Natural Area: (655acres)

- Restore open barrens and pine savannas
- Control invasive, exotic species
- Prescribed burns to maintain open barrens

What would you see in an average year?

- Harvest will not be seen from the Brule River.
- Passive Management in some areas for aesthetics.
- Special aesthetics guidelines along major roads will continue.
- Create and maintain a core area of 200-400 ac of open barrens habitat in the SNA through 2-4 clearcuts, prescribed fires or mechanical actions for a total of about 50 ac every year. This acreage is included within the harvest and prescribed fire totals listed below.
- Over the 15-year period of this plan about 28% of the area will be thinned or regenerated through timber harvesting.
  - Jack Pine: Clearcut 1-2 blocks totaling 100 acres every 3-4 years years (average of 29 acres/yr over 15yrs) to maintain or increase jack pine. Adjoining blocks will be managed similarly to replicate large natural fires.
  - Red Pine: Thinning or selection harvests on 2-4 blocks of red pine totaling 80 acres each year to develop a more natural pine forest.
  - Scrub Oak: Maintain through selection or clearcut harvests of 1-2 blocks of scrub oak totaling 20 acres every other year. A portion of this acreage will be converted to jack pine through planting.
  - Aspen: Harvest 20-30 acres about every 3 years with clearcuts to maintain or convert aspen to other types.
- Regeneration efforts will focus on natural regeneration following prescribed fire or ground disturbance. Planting of jack pine will be done on about 10-15 acres per year to increase acreage of jack pine where natural regeneration was poor. Mechanical site preparation will be done prior to planting.
- Planting of jack, red and white pine.
- To increase survival of planted pines shrubs may be controlled with chemicals or cutting.
- Monitoring of vegetation change.
- Control invasive species where necessary and practical.
- 450 acres will be burned or mechanically treated 2 times for barrens.

Area 11 – Gordon Annex – Forest Production

Approximately 1,000 acres

See page 103

Management Objectives:

- Maintain existing forest of red pine, jack pine and aspen.
- Provide renewable forest products.
- Maintain long term lease on 45 ac with Department of Corrections.
- Maintain bog in a natural state.

What would you see in an average year?

- Passive Management in some areas for aesthetics.
- Special aesthetics guidelines along major roads will continue.
- Over the 15-year period of this plan about 42% of the area will be thinned or regenerated through timber harvesting.
  - Thin or regenerate 1-2 blocks of red pine every other year for a total of 40 acres thinned every other year to maintain this type.
  - Clearcut 10-20 acres of aspen about every 5 years to maintain areas of aspen.
  - Clearcut one, 40 acre block of jack pine every 8 years. Fire, ground disturbance or planting with mechanical site preparation will also be used.
- Planting of jack, red and white pine.
- Maintain white pine.
- Provide for hardwood pine mix along some roads and the Eau Claire river.
- Mowing for fire breaks.
- Eliminate scotch pine.

Area 12 – Willard Road – Native Community Management

Approximately 3,400 acres

See page 105

Management Objectives:

- Restore and maintain a mixed hardwood and pine forest.
- Increase age diversity and acreage of northern hardwoods.
- Passively manage 2 forest reference sites (310 ac total) for monitoring and research.
- Reduce aspen acres.
- Increase northern hardwood acres.
- Maintain areas of white birch, red pine, jack pine and white pine.

What would you see in an average year?

- Harvest will not be seen from the Brule River.
- Passive Management in some areas for aesthetics and research purposes.
- Special aesthetics guidelines along major roads will continue.
- Over the 15-year period of this plan about 18% of the area will be thinned or regenerated through timber harvesting.
  - Aspen: Conduct irregularly shaped clearcuts less that 15 ac in size. 1-2 blocks of aspen for an average of about 20 acres per year will be harvested. Northern hardwood species (maple, oak) will be encouraged by the small size and varied shapes of these cuts.
  - Red Pine: Thin 1-2 blocks of existing red pine plantations totaling about 20 acres every 2-3 years to develop more naturally appearing pine stands.
  - White Birch: Use selection, shelterwood and seed tree harvests on 1-2 blocks of white birch and red oak totaling 10-15 acres per year to encourage regeneration of these species. Mechanical ground scarification or prescribed fire will accompany these cuts.
- Ground disturbance or fire to encourage oak, white birch and pine reproduction.
- White Pine will be planted in scattered areas each year on edges of existing cut areas to increase diversity.
- Forest reference sites will be monitored to document change in existing stands of large red and white pine that are passively managed.

Area 13 – Lake Minnesuing – Scenic Management

Approximately 1,000 acres

See page 113

Management Objectives:

- Develop an older forest of northern hardwoods and hemlock for scenic values.
- Conduct research on the regeneration success of hemlock and white pine.

What would you see in an average year?

- Harvest will not be seen from Lake Minnesuing.
- Passive Management for aesthetics and research purposes.
- Very little management will be seen within this unit.
- Over the 15-year period of this plan less than 1% of the area will be thinned through timber harvesting.
  - A planned thinning of a 14-acre red pine plantation is expected in 2008. This will move the stand to a more naturally appearing density.
- Hemlock and white pine regeneration will be monitored. If data suggest that regeneration is not occurring then small openings may be cut to facilitate regeneration or planting of these species.
- Allow aspen, white birch and other species to grow old and die without harvest.
- Periodic monitoring for exotic plants.

Area 1 - Recreation Management
• Maintain the existing picnic/day use area at the mouth of the Brule River and current size and number of parking lots for recreational access. • Continue to provide habitat and access for bird watching, hunting and fishing which are the primary recreation pursuits in this area • Close all new forest management roads to motor vehicle traffic following any management activities. These roads would be open to walk-in hunters and other non-motorized recreators. • Establish and maintain a new "hunter walking trail" • A new small picnic area on Lake Superior near Bracket's Corner. This area would consist of extending an existing road, creating a parking area for 20-30 cars, building an accessible boardwalk between the parking lot and the beach area and installing a pit toilet and well.

Area 2 - Recreation Management
• Manage the historic Old Bayfield Road Hiking Trail as a moderately developed trail. Maintain the parking lot. Construct an accessible unisex pit toilet. This trail would be extended to the Co-op Park Bridge over the Brule River that currently supports the snowmobile trail in the winter. • Maintain the existing snowmobile trail that passes through this area and crosses the Brule River via the Co-op Park Bridge. ATV use of this trail would be limited to winter when snow cover is sufficient. • Close the primitive roads within this area to motorized use except to facilitate resource management activities. These roads would be open to hunters and other non-motorized recreators for walking only and may be periodically mowed.

Area 3 - Recreation Management
• Close the primitive roads within this area to motorized use except to facilitate resource management activities. These roads would be open to hunters and other non-motorized recreators for walking only and may be periodically mowed. • Maintain the high quality game species habitat for hunting recreation. • Maintain the existing snowmobile and winter ATV trail that passes through this area and crosses the Brule River via the Co-op Park Bridge.

Area 4 - Recreation Management

Area 4 - River Recreation

- All landings would be posted as quiet zones in compliance with NR45.04 (3)(k).
- The river would continue to be closed by state statute to all inflatable devices including innertubes, fishing rings, rafts, inflatable kayaks, and others.
- Reduce conflicts related to river recreation through increased education, user management and law enforcement.
- Develop a user education program incorporating ethics, ways to avoid conflicts between users, and respect for private lands.
- Interpretive kiosks will be placed at each canoe landing and landing hosts will be used at busy landings to help orient paddlers to the river and what is expected of them. Additional Rangers will also be used to reinforce this message and reduce conflicts on the river.
- Monitor and manage recreational use to assure compatibility with the natural resources and recreational facilities
- Collect data regarding the distribution of participants by location and time along the river, the size and nature of their group, whether they use commercial services to facilitate their trip, their motivations and expectations, and the nature of conflicts perceived by the user groups and adjacent landowners. Survey instruments will be developed and river monitoring and surveillance will be used to develop this data set.
- Continue to provide similar level of angler access through 18 parking lots and trails. Improve some conditions such as surfacing or erosion prevention as needed.
- Short primitive access trails on state land would be surveyed for condition and erosion control methods like waterbars and steps may be installed to mitigate damage from heavy foot traffic and erosion.
- Construct a scenic overlook at Waino Rock, located on the west side of HWY H approximately one-half mile south of CTH FF. A small, six to eight car parking lot would be constructed along the west side of HWY H and a trail would extend approximately 300 yards west to the Waino Overlook (the Promontory).
- The picnic area at the mouth of the Brule would continue to be maintained as a Type 4 rustic area with parking for 30 cars, 10 picnic tables, toilet facilities, water source and small motorized boat landing at the mouth of the Brule
- Drinking water wells and pit toilets would be provided at the most popular landings. The well at the Mouth of the Brule picnic area would also be replaced.
- The landings that will have new facilities include:
  Wells: Stones Bridge, Bois Brule, Pine Tree, HWY 13, Mouth of the Brule
  Toilets: Bois Brule, HWY 13 (replacement)

Area 4 - Copper Range Campground

- Manage this site to provide a rustic and scenic camping experience that provides sufficient services to maintain a safe and enjoyable experience for users.
- As many as five sites would be eliminated and may be replaced by as many as three walk-in sites.
- Improve the water supply facilities to provide a safe, dependable water source. Wells would be converted to a pressurized system in order to provide more consistently safe water samples.
- A link to the Old Bayfield Road Trail across the Coop Park Bridge will be established as described in the Management Area 2 description.

Area 4 - Copper Range Campground (continued)

- Electrical hookups are specifically prohibited in the campground except to facilitate a campground host site and to operate a pressurized water supply.
- Vegetative management would focus on annual removal of diseased and defective trees and occasional (1-5 year interval) removal of selected trees to release the understory.

Area 4 - Bois Brule Campground

- Manage this area to provide a rustic and scenic camping and recreational experience that provides sufficient services to maintain a safe and enjoyable experience for users.
- As many as five sites would be eliminated to improve the spacing between sites.
- Vegetative management would focus on annual removal of diseased and defective trees and occasional (1-5 year interval) removal of selected trees to release the understory.
- Construct a group camp facility north of the current Bois Brule Campground. There would be a central parking area for 20 cars, a pit toilet and a pressurized water supply connected to the well in the Bois Brule Campground. This campgrounds would have four separate sites, each accommodating as many as 20 people.
- Improve the water supply facilities to provide a safe water source.
- Electrical hookups are specifically prohibited in the campground except to facilitate a campground host site and to operate a pressurized water supply
- The Stony Hill Nature Trail will be managed as a moderately developed hiking trail and will connect the campgrounds with the fish hatchery, the headquarters, the North Country Trail, and the group campground.

Area 5 - Recreation Management
• Maintain the portion of the existing Historic Portage Trail that extends into the Bog Area as a moderately developed trail. • Close the primitive roads within this area to motorized use except to facilitate resource management activities. These roads would be open to hunters and other non-motorized recreators for walking only and may be periodically mowed. • Maintain the existing canoe landings. • Shoreline management on St. Croix Lake would be done to demonstrate best management practices to other waterfront owners. Vegetation would be managed to screen the picnic area from full view as well as to develop large trees to provide shade to the area. • Continue to maintain the picnic area and boat landing as currently operated. • The historic marker would be relocated to the picnic area to offer a better opportunity to pause and read the marker text as well as make a connection between the state forest and the protection of this important trail • The picnic area would have a rustic, CCC era style through round wood construction of picnic tables and benches, round wooden signposts, and rustic routed wooden signs in a historic font. The artesian well would be fitted with an attractive wellhead and shelter that would reflect CCC era construction of similar sites. • The Stone Chimney Road canoe landing would continue to provide parking for approximately four cars. A moderately developed trail would be maintained from the parking lot to the river. • The landing at HWY P offers parking for two to three cars on the side of the road. Parking along side the road will continue to be permitted. No additional developments are suggested for this area. • The St. Croix Picnic Area would provide parking for 10-15 vehicles and trailers. As many as 10 picnic tables would be provided. The boat landing and pier would continue to be provided and may need to be replaced during this planning cycle due to deterioration of the concrete landing. At that time the orientation of the landing would be reconsidered to provide the easiest access. • A section of the North Country Trail would be constructed east of HWY P, passing through part of the bog, crossing to the west side of HWY P and heading towards Solon Spring.

Area 6 - Recreation Management
• Provide existing levels of trail facilities, grooming and maintenance for cross-country skiing. These would be fully developed trails cleared 20 feet or more and maintained 16-20 feet wide, providing the necessary vegetation maintenance along the trails to facilitate grooming and safe recreation. • Expand the Afterhours Ski Trail by building and an additional loop. • Interpretive signs will be placed along the trail describing the role forest management plays in providing recreation opportunities. • An Adirondack style warming shelter to provide a rest area and picnic opportunity. A pit toilet would be provided along the trail, at the point furthest from the trailhead.

Area 7 - Recreation Management

- Construct rustic shelter on the terrace north of the headquarters building for use during education programs.

Area 8 - Recreation Management

- Maintain the existing snowmobile and winter ATV trail that passes through the area as open for winter use only. It would be closed to motorized traffic the rest of the year.
- Maintain the existing North Country National Scenic Trail that passes through this area as a lightly developed trail with the existing parking lot and access.
- Develop a cross-country skiing system. A 20-25 mile network of trails specifically laid out for the purpose of cross-country skiing. These trails would be unsurfaced and mowed.
- Develop a parking lot for the Devils Hole Trail System with the capacity for 100 cars with a natural surface of grass or other suitable natural material. No specific accommodations or operations will be made to support mountain bikes. A rustic warming shelter with flush toilets, and a separate and concealed maintenance facility would be provided. This facility would be developed on Samples Road about 1 ½ miles from the intersection of Troy Pit Road and Highway 27. This area provides adequate area to construct parking lots, buildings, and trails on flatter lands adjacent to the rolling topography sought out for skiing. It also utilizes existing roads to get to the site.
- The current network of forest roads would be utilized during management activities, and individual roads would be closed to public access based upon the potential for resource degradation. Forest roads opened for management purposes are generally open to public access during the management period of about 2 years. After this time they are gated or bermed.

<u>Rush Lake</u>

- Maintain the existing walk-in access for boating as well as 2 small parking areas.

Area 9 - Recreation Management

- Maintain current level of forest roads open to public use unless degradation occurs.
- Forest roads opened for management purposes are generally open to public access during the management period of about 2 years. After this time they are gated or bermed.

Area 10 - Recreational Management
• Maintain existing trails • Maintain North Country National Scenic Trail • Maintain the existing snowmobile and winter ATV trail that passes through the area, open from December 1 to March 30 annually. The trail would be closed to motorized traffic the rest of the year. • A loop trail and scenic overlook is to be added to the segment to the existing snowmobile trail and winter ATV trail that parallels the Bois Brule River. The loop would be approximately 200 yards long and would lead riders to a scenic overlook of the Brule Bog located on the terrace adjacent to Jerseth Creek. • Maintain current level of forest roads open to public use unless degradation occurs. • Forest roads opened for management purposes are generally open to public access during the management period of about 2 years. After this time they are gated or bermed.

Area 11 - Recreational Management
• Area limited for public use due to the Correctional Facility on site • Forest roads opened for management purposes are generally open to public access during the management period of about 2 years. After this time they are gated or bermed.

Area 12 - Recreational Management
• Close existing roads to motorized use if degradation occurs. • Forest roads opened for management purposes are generally open to public access during the management period of about 2 years. After this time they are gated or bermed.

Area 13 - Recreational Management
• Maintain existing boat landing • Close existing roads to motorized travel • Primitive trails would be maintained by periodic mowing to accommodate hikers and picnikers.

LAND MANAGEMENT AREAS

The following land management area descriptions are organized geographically based on their ecological condition. The delineation of each area is based on either significantly different natural community management objectives or areas of concentrated facilities.

The method used for organizing the ecological landscapes for the Brule River State Forest is based on the National Hierarchical Framework of Ecological Units (NHFEU). The NHFEU is an ecological classification system that divides landscapes into ecologically significant regions at multiple scales: Province, Section, and Subsection. Ecological types are classified and units are mapped based on the associations of biotic and environmental factors; which include climate, physical geography, water, soils, air, hydrology, and potential natural communities.

The Brule River State Forest and surrounding region are within Province 212, the Laurentian Mixed Forest (Bartlet et. al 1999). The finer ecological units of Section and Subsection are characterized by combinations of climate, geomorphic processes, topography, and stratigraphy. As illustrated in the Land Management Area map in the Maps Section, ecological features of the BRSF region include characteristics of three Subsections (Lake Superior Clay Plains, Mille Lacs Uplands and Bayfield Sand Plains) within the BRSF boundary.

Please refer to the Land Management Classification map in the Maps Section, at the back of this document, for the location of the 13 management areas described in the following text. Land Management Areas within the Brule River State Forest have been divided into blocks with similar ecological potential and management objectives. The basis for their ecological characteristics comes from their respective ecological landscapes, (see Ecological Landscapes map in the Maps Section) which are based on the NHFEU classifications. Each area is considered as a component in the overall management of the property.

Each land management area has been assigned a Land Management Classification and includes a brief description of the area, the short-term and long-term management objectives, management prescriptions and a description of the recreation management in that area. The Land Management Classifications of Scenic Resource Management Area and Recreation Resource Management Area have also been assigned a *recreational use setting subclassification*.

LAKE SUPERIOR CLAY PLAIN – ECOLOGICAL LANDSCAPE

Subsection 212Ja (National Hierarchical Framework of Ecological Units)

The Lake Superior Clay Plain defines the northern border of both Douglas and Bayfield Counties and the northern portion of the Brule River State Forest (BRSF) (Refer to the Land Management Classification map in the Maps Section at the back of this Document) Attributes of this ecological landscape include level-to-gently sloping topography, heavy red clay soils, and short, steep-sided stream valleys. Few natural lakes exist within the Subsection, but many small rivers and streams

dissect the lake plain and moraine. Proximity to Lake Superior keeps the climate relatively cool and moist in spring and summer.

The circumboreal forests of spruce and fir occur across parts of Canada, Alaska, the former Soviet Union, and the Scandinavian countries. Historically, the Lake Superior Clay Plain contained Wisconsin's most extensive acreage of boreal forest. However, the acreage was relatively small compared to its continental extent and the forest consisted of a distinctive species association, which may reflect the southern range limit of the circumboreal forest, the unusual lacustrine red clay soils, and/or the influence of Lake Superior. The 1850s Lake Superior boreal forest was dominated by white pine, white birch and white spruce (Eckstein et al. 2001). Tamarack, aspen, red pine, and balsam fir were common associates. The understory had a dense growth of alder, beaked hazel, and mountain maple (Fassett 1944). Lowlands associated with drainages and depressions on the clay plain were characterized by white cedar, tamarack and white birch with aspen and unidentified spruce as common associates (Eckstein et. al 2001).

Between the 1870s and 1930s most of the land within this ecological region was heavily logged, subjected to repeated soil consuming wildfires, and land cleared for agricultural purposes. The land clearing, repeated fire and farming activities caused erosion and deepened many ravines. Following this period, various early successional species including alder, other shrubs, aspen and birch began to take hold by seeding or spreading vegetatively into fallow fields. In some areas, early management efforts focused on fire control and restoring the forest for water resource protection and other forest benefits. After more than 50 years of natural recovery and management, some of the forest areas had recovered enough that harvesting forest products and producing optimum game habitat became management opportunities.

Across the region, this ecological landscape is largely forested with substantial agricultural lands near the cities of Ashland and Superior (Brusoe et al. 2001). Within the Lake Superior Clay Plain on the BRSF and the region there are four primary land uses that exist currently and/or historically and that fit with the ecological capability of the landscape. These are management for early successional forests (primarily aspen) to produce forest products and game species habitat, management for hayfields/non-native grasslands for hay/pasture and some wildlife species, growth of northern hardwoods dominated by sugar maple/red maple for forest products and recreational purposes and restoration of a boreal forest for forest product, ecological and biodiversity values. Aspen/white birch forests make up about 50% of the landscape although white birch is in decline and balsam fir is a common understory species in these forests. Northern hardwoods dominated by either sugar or red maple grow on 24% of the clay plain. The agricultural lands on the clay plain are mostly grasslands, including; hayfields, pastures and fallow lands, which make up 20% of the regional land cover. The remaining upland acreage is primarily conifer dominated forest but the combined cover of white spruce and balsam fir is only 6% of the clay plain. These four covertypes represent the capability of this ecological landscape given the currently emphasized land uses.

On the Lake Superior Clay Plain, the purchase of lands for the Brule River State Forest did not begin until the 1960s. Management of Clay Plain lands within the state forest have been managed

primarily to encourage and guide the restoration of a diverse and productive forest and to protect the excellent water quality of the Brule River and tributaries. Some areas have been maintained in grass or developed by constructing wetland impoundments for wildlife habitat and water control. The dominant upland community types on the state forest Clay Plain lands (Management Areas 1-4) are aspen/white birch (60%), spruce-fir (13%), grasslands (7%) and northern hardwoods (5%). The remaining 15% consists primarily of forested and unforested wetlands. Generally, the balsam fir is showing the greatest increase while white birch is showing a substantial decline. Over the last 20 years as more scientific information has been collected and the demands on the state forest have changed the management of Brule River State Forest has shifted to a more integrated and ecosystem level approach.

Area 1

Lake Superior Clay Plain
Native Community Management Area

This management area, including both private and state owned lands within the area boundary, is approximately 11,800 acres in size. However, ownership is fragmented by approximately 3,000 of private land (Refer to the Maps Section at the back of this Document – Land Management Classification map). This management area includes all of the state forestlands north of an irregular line that approximately follows CTH FF. Approximately 7,000 additional acres could be added to Area 1 if purchased. All management objectives and descriptions are based on the lands in state ownership at the time this master plan was written(2002).

The uplands of Management Area 1 consist of about 50% aspen with many of these stands showing strong development of balsam fir as a secondary species. The various grassland areas total 11% of the area while the fir-spruce covertype total 8% of Area 1. The remaining acreage consists of a diversity of forest and shrub habitats. Stands of white birch, alder, red pine, and white pine are present throughout the uplands. Generally, white birch has shown a steady decline while balsam fir is regenerating well. Scattered individual white spruce and white pine exist through this area but regeneration of these species is limited. This area contains the majority of previously developed wetlands and contains a state waterfowl refuge along Clevedon Road.

Extensive stretches of undeveloped Lake Superior shoreline are found to the east and west of the mouth of the Brule River. Much of this is an unvegetated sand beach. The present upland vegetation behind the beach and above the low clay bluffs generally consists of open stands of trembling aspen, white birch and a dense shrub layer of speckled alder.

The existing natural community composition provides a variety of benefits. The aspen areas provide habitat for early successional wildlife and popular game species and maintenance of this habitat provides a sustainable source of forest products. However, early successional habitats are common throughout the clay plain on other lands (Brusoe et al. 2001). Recreational data indicate that while similar game habitat is found elsewhere in the region, the BRSF attracts hunters seeking the unique setting it provides (Watkins et al. 2001). Over 30,000 hunter visits are made to the entire state forest each year (Brusoe et al. 2001). The managed wetlands offer waterfowl hunting, wildlife viewing, wetland wildlife habitat and provide storm water storage to reduce rate and volume of major snowmelt and rain events. The grasslands currently maintained in this area were not a part of the historic condition but offer opportunities to manage for rare or declining grassland birds as well as some game species (Sample and Mossman 1997, Bartelt et al. 1999, Epstein et al. 1999, Eckstein et al. 2001). Grasslands were the only existing habitats in this area where specific management needs for rare or uncommon species were noted in this area by the *Biotic Inventory of the Brule River State Forest* (Epstein et al. 1999).

However, the most unique quality of this management area is it's potential for restoration of the historic clay plain boreal forest (Epstein et al. 1999, Eckstein et al. 2001, Brusoe et al. 2001). The boreal forest community was historically of limited extent within Wisconsin. Although boreal forest exists broadly in other parts of the continent, it is now considered a rare community in Wisconsin. Analysis of historic records shows a high importance of white spruce, white pine, and white birch, the "three whites," in the original forest cover along with common associates including white cedar, red maple, balsam fir, aspen, upland white cedar and upland tamarack. (Mossman et al. 1997, Bartelt et al. 1999, Eckstein et al. 2001). Management on the BRSF has been slowly increasing the fir-spruce covertype in this area to a percentage that is twice that of the surrounding landscape. In addition, much of the aspen covertype in this management area supports balsam fir at various age classes as the second most dominant tree species. The existing conifer dominated forests in this part of the BRSF provide multiple benefits such as increased regional biodiversity, aesthetic values and habitat for boreal birds and plants on the southern edge of their range. Some existing areas of fir-spruce are developing old growth structural attributes for this community type such as large trees, snags, coarse woody debris and tip-up mounds. This forest composition is rare throughout the region and is generally not expected to be a management priority for other landowners (Bartelt et al. 1999). This unique opportunity is the basis for the management emphasis of Management Area 1.

The restoration of the historic clay plain boreal forest community faces some difficult challenges and will be a slow process (>100 years) with no guarantee of success (Eckstein et al. 2001). The *Community Restoration and Old Growth Assessment* recognizes the challenge of restoration in this community type and recommends a varied and adaptive management approach (Eckstein 2001). Increasing some components of this forest community such as white birch may be achieved sooner than other components such as white pine. To maximize the chances of success, the restoration plan would need to be adaptive to prescriptions that work and would need to experiment with alternative methods. While the forest management practices within the BRSF over the last 40 years have facilitated some increase in conifers on the clay plain, the changes in

soil structure and seed sources prior to state ownership have created long-term impacts to this system. Many of the historically occurring seed sources are reduced or no longer present in the area. Restoration efforts will be further challenged by the clay soil in the area, which is often either too wet or too dry for successful seeding or planting of trees. The size and shape of the property and dominant land uses in the surrounding landscape will limit large-scale conservation opportunities. The following objectives and prescriptions for Management Area 1 focus primarily on using a variety of passive and active management techniques to increase the dominance of the historic clay plain boreal forest species.

Area 1 - Long-term Management Objectives - 100 years:

- Develop and maintain an ecological landscape dominated by clay plain boreal forest communities interspersed with areas of wetland and stream habitats. The upland landscape would be large enough for a diversity of covertypes and ages to exist at levels necessary to support the wildlife and plant species associated with these different habitats and successional stages.

- Manage the upland forest toward a dominance of white spruce, white pine, and white birch, along with common associates including white cedar, balsam fir, aspen, red pine and upland tamarack. This forest would have a representation of a full spectrum of age classes within these forest types.

- Establishing large forest patches (100s to 1,000s acres) with relatively high canopy closure and good representation of clay plain forest species.

- Develop a forest with at least 10% of the stands supporting a structure containing large trees of longer lived species such as white pine, white spruce and white cedar and much of the structural diversity typical of natural old growth forests, including large living trees, dead trees, snags, tip-up mounds and a substantial amount of coarse woody debris. The understory would likely be characterized by a dense growth of shrubs such as alder and beaked hazel. This forest structure would benefit wildlife such as woodpeckers, cavity nesters, small mammals, amphibians and predators such as fisher and bobcat.

- Maintain white birch as a dominant component along with associated early successional species.

- Continue to protect water quality and aquatic habitat of streams by managing the riparian forest primarily to reduce run off from clay soils and prevent unnatural levels of bank erosion.

- Manage several conifer dominated areas passively and monitor as reference areas with considerations. Management actions would be considered in cases of exotic plant control and public safety needs.

- Maintain, create and enhance constructed wetlands to provide habitat for a wide variety of wetland birds such as sora rail, American bittern, spotted sandpiper, pied-billed grebe; song

birds such as sedge wrens, yellow-headed black birds, eastern kingbird; and waterfowl such as mallard, blue-winged teal, hooded merganser, and Canada goose.

- Continue to provide the habitat and setting to support the unique hunting opportunities offered by the Brule River State Forest.

- Manage the Brule River Boreal Forest State Natural Area and the Pearsen Creek portion of the Bear Beach State Natural Area as passive management reference sites to provide base information for adaptive management approaches to clay plain boreal forest restoration (Refer to the State Natural Area map in the Maps Section at the back of this Document)

- Manage the Bear Beach State Natural Area to protect the banks and beach of the Lake Superior shoreline (Refer to the State Natural Area map in the Maps Section at the back of this Document)

- Preserve and enhance the natural aesthetic quality in areas seen from the Brule River; its tributaries, lagoons, the Lake Superior shoreline and designated public use areas.

<u>Area 1 - Short-term Management Objectives – 50 years:</u>

- Conduct forest reconnaissance monitoring of vegetation every 10 years to measure change in actively and passively managed areas
- Use monitoring information on changes in composition and structure from existing conifer dominated reference areas for future management decisions.
- Reduce aspen covertype from 4,100 acres to 2,500 acres to allow an increase in other covertypes. Aspen would remain a component of these other covertypes.
- Increase covertype of fir spruce from 600 acres to 2,000 acres
- Increase covertype of white pine from 50 acres to 200 acres and increase the presence of white pine throughout other covertypes.
- In the next planning cycle evaluate the value of the grasslands and the potential for converting these sites to forested communities.
- Establish white pine and white spruce seed source in areas lacking these species.
- Increase the white birch covertype from 350 acres to 650 acres.
- Regenerate some areas of aspen and fir and slowly convert other areas to the target species.
- Experiment with management options to increase white cedar or tamarack in areas currently dominated by tag alder.
- Maintain areas of existing grassland (800 acres total) south of Brule River Road within this management area in an early successional grass and shrub cycle of management in order to provide habitat for a variety of game and non-game wildlife species, including upland sandpiper, sharp tailed grouse, eastern meadowlark, clay colored sparrows, woodcock and bobolink. The grasslands would also provide summer habitat for leopard frogs, nesting habitat for waterfowl, grazing and fawning areas for deer, and contribute to year-round habitat for sharp-tailed grouse.

Area 1 - Authorized Management Activities:
Depending on the existing community type, different management activities will be used to manage the forest toward the same desired future condition. Because of the experimental nature of restoring a conifer dominated clay plain forest, a variety of techniques will be applied over small areas to determine successful management scenarios. Management of grasslands and wetlands also require a variety of active management techniques. Activities may include, passive management, clearcuts, shelterwood, group selection and selection harvests, mechanical ground disturbance, mowing and mechanical brush control, haying, earthwork for drainage and wetland management, water level manipulation on existing impoundments, planting native trees, shrubs or ground vegetation and prescribed fire.

Area 1 – Resource Management Prescriptions:
As appropriate for the specific site, existing ecological communities and current conditions, the following management prescriptions will be used to achieve the long-term and short term objectives identified above:

- As opportunities for acquisition or cooperative management in the boundary expansion develop, conduct inventories and develop specific management prescriptions to implement restoration and management to achieve the goals of landscape level clay plain boreal forest restoration and management.
- Reduce peak stormwater flows to the Brule River by plugging old drainage ditches to restore more natural drainage patterns across the landscape to protect water quality.
- Limit logging operations to periods when the soil is dry or frozen and restrict construction of new roads in order to reduce potential for increasing runoff. Perform no timber harvests on the slopes along the stream corridors, except as necessary to maintain public safety and control invasive exotic species. Retain large woody debris to minimize erosion, reduce rate of run-off, and increase habitat quality for both fish and wildlife.
- In some areas increase downed woody debris to benefit wildlife, including wood frogs, toads, blue-spotted salamanders, mice, chipmunks, etc.
- Manage the Brule River Boreal Forest State Natural Area (652 acres) and the Pearsen Creek portion of the Bear Beach SNA as passive management reference sites to provide information for the adaptive management approach to clay plain boreal forest restoration.
  (Refer to Brule River State Natural Areas and Map in the back of this document)
- Manage the Bear Beach State Natural Area (103 acres) to protect the banks and beach of the Lake Superior shoreline. (Refer to Brule River State Natural Areas and Map in the back of this document)

  Passive Management Reference Areas
  - Perform no forest management in designated reference areas, except as necessary to maintain public safety and control invasive exotic species.
  - Three sites will serve as reference areas for boreal forest. These sites include the Task Creek-Weir Riffles, Bracket's Corner and the Pearson Creek sites. The boundaries of these areas are similar to those in the Biotic Inventory but have been adjusted to facilitate the management goals.

- The Task Creek-Weir Riffles site and the Pearson Creek site (as part of the Bear Beach SNA) will be established as a State Natural Area. (Refer to the State Natural Area map in the Maps Section at the back of this Document)
- Continue to monitor these areas for vegetative changes at least every 10 years using forest reconnaissance and repeat biotic inventory monitoring at least every 20 years.

Conifer-dominated stands

- Balsam fir is currently the dominant conifer on the clay plain of the Brule River State Forest. Manage areas of balsam fir to perpetuate balsam fir and increase white pine, white spruce and white birch through shelterwood, group selection, and selection harvests. Where white pine and white spruce are absent plant these species to establish a seed source. Various planting techniques and configurations will be used and monitored for success.
- Encourage conifers through selective removal of hardwoods (including aspen), seeding, planting, or allowing natural succession.
- Existing areas of white pine or white spruce can serve as a seed source so actions may be concentrated on managing surrounding areas to encourage regeneration of these species. Within these stands they may be thinned to allow growth of larger trees while increasing the presence of old growth structure such as snags and downed woody debris.
- Stands of white cedar will be retained as a seed source for expanding the distribution of this species.
- The few red pine plantations in this area will be gradually thinned to create forest stands with greater diversity and a more natural structure.

White birch

Manage for areas of white birch with a mix of other early successional species through clear cuts, group selection harvest, shelterwood harvest and ground disturbance. Ground treatments necessary for white birch regeneration may include prescribed burning, anchor chaining, blade scarification, or summer whole tree skidding.

Alder

Some stands of existing alder, particularly on upland clay soils, are present because of soil conditions, altered hydrology, and tree seed source lost during the period before state management. The goal is to shift these areas to increased presence of species that were historically more common on these sites, such as white cedar and tamarack. However, there are no proven techniques to accomplish this goal. A variety of active management techniques including harvesting and planting will be experimented with to reduce the area or dominance of alder. Alder associated with natural drainages will be maintained.

Aspen-dominated stands

- Use small clear cuts (two to ten acre irregular areas), group selection, or seed tree harvests to remove overstory aspen or other hardwood species in order to increase the conifer component by allowing more sunlight for improved conifer reproduction and growth.
- These management prescriptions are not intended to replicate the historic disturbance sizes or frequency but represent a balance of managing for desired species, minimizing the potential for increasing run off on clay soils, working within the narrow nature of the current property and aesthetic conditions desired by some users of the state forest.
- These actions will regenerate aspen and early successional species while increasing the percentage of conifers over several rotations.
- These harvests would be designed to promote regeneration of white spruce, white pine and white birch, which require partial to full sunlight while allowing maintain aspen as a component. Additional actions such as ground disturbance, fire or planting may be used if natural regeneration fails.

Grassland/Constructed Wetland areas

- Maintain grasslands through hay contracts, periodic mowing or prescribed burns.
- Wetlands would be restored, enhanced, or created to foster sedge meadows, shallow marshes, and open marsh wetland habitats through water manipulation and earthwork necessary to construct or maintain water control structures.
- Native species, such as wild rice, may be planted as part of wetland enhancement
- Consider using herbicides to control exotic plants or to create the desired vegetative composition when other natural or mechanical methods are not effective.

Lake Superior Beach

- The beaches and banks along Lake Superior would be maintained for their scenic and ecological values. The Bear Beach a State Natural Area will encompass much of this habitat.

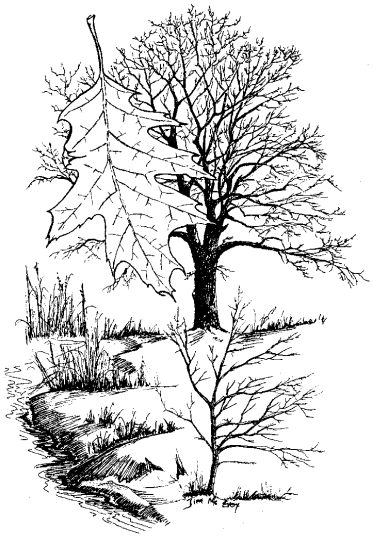
Area 1 - Recreation Management Prescriptions:

- Continue to provide habitat and access for bird watching, hunting and fishing which are the primary recreation pursuits in this area.
- Maintain the current size and number of parking lots for recreational access.
- Close all new forest management roads to motor vehicle traffic following any management activities. These roads would be open to walk-in hunters and other non-motorized recreators.
- Establish and maintain a new hunter walking trail within this area.
- Maintain the existing picnic/day use area.
- A small picnic area would be developed on Lake Superior near the area referred to as Bracket's Corner. This area would consist of extending and existing road approximately 800 feet and creating a parking area for 20-30 cars. An accessible boardwalk would be laid between the parking lot and the beach area, approximately 300 feet. A pit toilet and well would also be installed.

Area 1 - Cultural Resources: Preserve and protect the historic Clevedon settlement grave sites in this management area**.**

Area 2

Sugar Camp Hill / Lenroot Ledges
Native Community Management Area



This area, including both private and state-owned lands within the project boundary, is approximately 2,000 acres in size. It is located on the west side of BRSF in the area known as the Copper Range. This area includes the following sites identified in the *Biotic Inventory* (Epstein et al 1999): CCC Miller Boreal Forest and Pines, Sugar Camp Hill, and Lenroot Ledges. As suggested in the *Biotic Inventory*, these sites have been combined into a single management area, thereby increasing their combined conservation value. This is the core area of the largest block of closed canopy, northern hardwood forest that currently exists on the Brule River State Forest. BRSF cover within this area contains a mixture of northern red oak, basswood, sugar maple, ash, balsam fir, aspen, and white birch. Reproduction of shade-tolerant species like sugar maple and basswood is good under this closed canopy while reproduction of red oak or white birch will depend on some future disturbance. Closer to the river, white pine and white spruce become more common. This area contains the richest soils found on the BRSF, however, they are still poor compared to other ownerships in the adjacent Mille Lacs Ecological Landscape.

Scientific assessments noted the potential to support a northern hardwood forest on Sugar Camp Hill and boreal forest on Lenroot Ledges. However, the *Community Restoration and Old Growth Assessment* (Eckstein et al. 2001) rated the restoration /old growth opportunity for the northern hardwood community as low. *The Regional Ecology Assessment* (Bartelt et al. 1999) noted that other public lands in the region have greater opportunity to support the northern hardwood community type.

Wisconsin Department of Natural Resources (WDNR) experts discussed the varied findings of the assessments and determined that, while the opportunity to restore an "old growth" northern hardwood community was considered a relatively low priority in the regional context, it was agreed that it is an important community in the context of the BRSF's landscape management. It is important because it provides the largest block of closed canopy forest, which increases the conservation value for many forest dwelling species and natural processes. It also provides wildlife habitat, stand diversity, serves as a buffer for rare species, and contributes to the establishment of a wildlife corridor (Epstein et al. 1999).

Land ownership in this area is a mixture of public and private. This area contains several sites of historical value. The Old Bayfield Road hiking trail follows an old travel route that connected the towns of Superior and Bayfield and was traveled by foot and later by horse and wagon. Copper mines were active on Sugar Camp Hill in the 1870s and one old mine can be viewed from the hiking trail.

A designated snowmobile and winter ATV trail crosses through this area. It connects with the Tri-County Corridor on the south end, continues northward from Miller Road, turns east and crosses the river near the Copper Range Campground, continues east and connects with a Bayfield County snowmobile trail. Winter motorized recreation is popular in the Brule region. This trail is a connector snowmobile trail that crosses the Brule River State Forest, linking a regional trail network (Watkins et al. 2001).

Area 2 - Long-term Management Objectives – 100 years:

- Develop a primarily closed canopy, managed old-growth, native mixed species forest connected with the Brule River corridor.
- In the Sugar Camp Hill area maintain the well developed canopy with a full mix of northern hardwood species.
- In the Lenroot Ledges area, the objective would be to maintain a conifer-dominated forest realizing that much of this area is in private ownership and out of state control.
- In the remainder of Area 2 (primarily aspen) develop northern hardwood forest with some areas dominated by conifers (balsam fir, white spruce, white pine). The vegetation would be characterized by a large block of northern hardwood forest containing a mixture of northern red oak, sugar maple, basswood, yellow birch, ash, balsam fir, aspen, and white birch. This would provide potential habitat for a variety of wildlife species including some rare species such as black-throated blue warbler and red-shouldered hawk.
- Closer to the river, white pine and white spruce would be encouraged. These stands would be represented by large and relatively old trees (older than their traditional rotation age). This community would have much of the structural diversity of typical natural old growth forests, including dead trees, snags, tip-up mounds and a substantial amount of coarse woody debris.
- Forest aesthetic qualities would be preserved and enhanced, particularly in areas seen from the Brule River, its tributaries, and designated public use areas.
- Maintain the existing recreational opportunities (Refer to the Recreation map in the Maps Section at the back of this Document) to accommodate visitors while maintaining the rustic character of the property, two goals identified in the *Recreational Supply and Demand Assessment* and the Property Vision and Goals (Watkins et al 2001).
- Maintain the fire tower on Sugar Camp Hill according to the needs of the DNR's fire detection program.

Area 2 - Short-term Management Objectives – 50 years:

- Increase the covertype of northern hardwood forest from 660 to 1,000 acres while encouraging a diverse forest of northern red oak, sugar maple, basswood, yellow birch, balsam fir, aspen and white birch.
- Maintain the existing 150 acres of red oak by encouraging regeneration of this species.
- Manage for an increase in the fir-spruce covertype from 100 acres to 200 acres and the white pine covertype from 30 to 80 acres particularly along the Brule River and tributaries, on state ownership in Lenroot Ledges area and in CCC Miller Boreal Forest and Pines area.
- Decrease the covertype of aspen from 1,200 acres to 600 acres.
- Manage for large diameter, native tree species and old-growth structural characteristics.

Area 2 - Authorized Management Activities:
Depending on the existing community type, different management activities will be used to manage the forest toward the same desired future condition. Activities may include, passive management, modified clearcuts (2-10 acres), shelterwood, group selection and selection harvests, prescribed fire, seeding and planting.

Area 2 – Resource Management Prescriptions:
As appropriate for the specific site, existing ecological communities and timber stand conditions, the following management prescriptions will be used to achieve the long-term and short term objectives identified above:

Overall

- Continue to practice Big Tree Silviculture, which extends the rotation ages for long-lived tree species on the best quality sites to establish larger trees, and other old growth characteristics. In this management area it would include white pine, northern hardwood and red oak on the best quality sites for those species.
- Perform no timber harvests on the slopes of the stream corridors, except as necessary to maintain public safety and control invasive exotic species. Retain large woody debris on slopes along streams to minimize erosion, reduce rate of run-off, and increase habitat quality for both fish and wildlife.
- Protection of vernal (ephemeral) ponds and rock outcroppings

Northern Hardwood

- Sugar Camp Hill area - Manage these areas with small-scale actions (2-10 acres).
- Use selective harvest in the northern hardwood covertype to encourage development of a managed old growth condition.

Red Oak

- In northern hardwood areas limited management would occur to maintain a component of oak. This would include small (2-5 acres) clear cuts to regenerate this species. These small cut areas would be done in conjunction with a good acorn crop year to facilitate regeneration of the oak. This would be done on a maximum of 150 acres, spread out over a 50 year time period, on the Sugar Camp Hill site (550 acres).
- These cuts will be staggered over time to assure that there are large block of continuous forest cover in the management area.
- Manage existing stands of red oak through small (2-5 acres) clear cuts to regenerate the species but allow trees to develop to their biological age.
- Oak regeneration will be monitored and ground disturbance methods such as fire or scarification may be used if needed.

Conifer-dominated stands

- Balsam fir is currently the dominant conifer on the clay plain of the Brule River State Forest. Manage areas of balsam fir to perpetuate balsam fir and increase white pine and white spruce through shelterwood, group selection, and selection harvests possibly combined with planting.
- Existing areas of white pine or white spruce can serve as a seed source so management actions may concentrate on managing surrounding areas to encourage regeneration of these species. Within these stands they may be thinned to allow growth of larger trees while increasing the presence of old growth structure such as snags and downed woody debris.
- Stands of white cedar will be retained as seed source for expanding the distribution of this species.

Aspen

- Small clear cuts (2 to 10 acre irregular areas), group selection, selection or seed tree harvests to remove overstory aspen in order to allow in more sunlight for improved conifer or northern hardwood reproduction and growth. These harvests may be needed in conjunction with planting or seeding to promote the conifer covertype.

Swamp Hardwoods

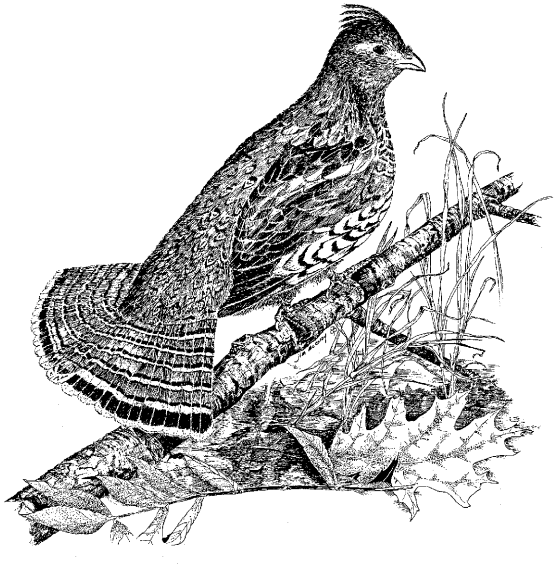
- Manage to maintain the species diversity characteristics of this community type

Area 2 - Recreation Management Prescriptions:

- Manage the historic Old Bayfield Road Hiking Trail found on Sugar Camp Hill as a moderately developed trail, except that no significant grading would be done to provide access for people with disabilities. Maintain the parking lot at the trailhead at its current capacity of approximately 6-8 cars. Construct a small accessible unisex pit toilet. This trail would be extended to the Co-op Park Bridge over the Brule River that currently supports the snowmobile trail in the winter. This would provide for a connection between this hiking trail and the Copper Range Campground.
- Close the primitive roads within this area to motorized use except to facilitate resource management activities. These roads would be open to hunters and other non-motorized recreators for walking only and may be periodically mowed.
- Maintain the existing snowmobile trail that passes through this area and crosses the Brule River via the Co-op Park Bridge. ATV use of this trail would be limited to winter when snowcover is sufficient.

Area 3

Miller Road /CCC Square
Habitat Management Area



The majority of this management area occurs within the larger Lake Superior Clay Plain ecological landscape. The area is south of the Sugar Camp Hill area, west of the Brule River and north of HWY 2. This area, including both private and state owned lands, is approximately 2,000 acres in size with about 1,700 acres of state ownership. The history of this area includes attempts at pasturing followed by large areas of timber harvesting in the 1960s and 1970s.

The current vegetation is about 50% aspen dominated stands from 20-60 years old. Alder brush makes up another 22% of the area. Smaller portions of the management area consist of lowland brush, grassland/wetland, red pine and conifers found primarily on the steeper terrain along river and creek drainages. This historic boreal landscape contained areas of younger aspen/birch forest but in a much lower percentage than currently exists here. The aspen areas provide high quality habitat for early successional wildlife and popular game species and maintenance of this habitat provides a sustainable source of forest products. Early successional habitats are common throughout the clay plain on other lands, however, state forest lands are easily accessible and are a popular hunting area (Brusoe et al. 2001).

No specific management needs for rare or uncommon species were noted for this area in the *Biotic Inventory of the Brule River State Forest* (Epstein et al. 1999). This area currently is occupied by an active wolf pack.

Recreation in this area is primarily hunting, wildlife viewing and snowmobiling. The snowmobile trail in this area is an important "connector" trail that crosses the Brule River State Forest, linking a regional trail network (Watkins et al. 2001).

<u>Area 3 – Long-term Management Objectives – 100 years:</u>

- Manage for a forest dominated by the early successional stages of the clay plain boreal forest but with greater species and age class diversity than occurs presently. This will continue to provide for high quality habitat for game and non-game wildlife species. Species that would benefit from maintaining early successional habitats range from game species such as ruffed grouse, woodcock, snowshoe hare, deer, and bear to many non-game birds such as golden-winged warbler, yellow-shafted flicker, clay-colored sparrow, and amphibians such as green grass snake and leopard frogs. Predator species that utilize these prey species would be sharp-shinned hawks, broad-winged hawks, fisher, bobcat, red fox, coyote, and timber wolves.

- Continue to generate forest products through managing for a diverse forest and desired wildlife habitat.
- Manage riparian forests along stream corridor slopes to promote conifer cover and to retain large woody debris with the primary goals of soil protection and maintenance of fish habitat.

Area 3 – Short-term Management Objectives – 50 years:

- Manage for regeneration of aspen as the dominant forest covertype with 700 acres but diversify the age classes within the area.
- Increase the diversity of conifer and hardwood species as secondary types.
- Maintain about 100 acres of existing wildlife openings within forested areas, grassland and constructed wetlands for wildlife habitat.

Area 3 - Authorized Management Activities:

Depending on the existing community type and desired forest condition different management actions will be implemented. Management of grasslands and wetlands also require a variety of active management techniques. Activities may include, passive management, clearcuts, shelterwood, group selection and selection harvests, mechanical ground disturbance, mowing and mechanical brush control, earthwork for drainage and wetland management, planting and prescribed fire.

Area 3 – Resource Management Prescriptions:

As appropriate for the specific site, existing ecological communities, wildlife species and timber stand conditions, the following management prescriptions would be used to achieve the long-term and short-term objectives identified above.

Overall

- Limit logging operations to periods when the soil is dry or frozen.
- Perform no timber harvests on the slopes of stream corridors, except as necessary to maintain public safety and control invasive exotic species. Retain large woody debris to minimize erosion, reduce rate of run-off, and increase habitat quality for both fish and wildlife.

Aspen

- Maintain aspen and white birch through small patch clearcuts (<20 acres) and manage for multiple age classes. Retain snag and den trees to provide for cavity nesting birds and animals. Retain individuals or patches of other tree species to increase within stand tree diversity. Encourage bur oak, black ash, white spruce, white pine, white birch, and balsam fir to create stand diversity.
- Continue to maintain smaller scattered forest openings through mowing, hand cutting, or limited herbicide applications. Additional openings would be considered and would be developed in conjunction with timber sales to minimize costs.

Conifer-dominated stands

- Balsam fir is currently the dominant conifer on the clay plain of the Brule River State Forest. Manage areas of balsam fir to perpetuate balsam fir and increase white pine, white spruce and white birch through shelterwood, group selection, and selection harvests. Where white pine and white spruce are absent plant these species to establish a seed source.
- Stands of white cedar will be retained as seed source for expanding the distribution of this species.
- A few small stands of red pine currently exist in this unit. Conduct periodic thinnings and site preparation to encourage growth and natural regeneration. Where natural regeneration does not occur, prepare appropriately for planting.

Alder

- Manage areas passively and monitor for presence of white cedar or tamarack.

Grassland/Wetlands

- Maintain grassland/constructed wetland site through hay contracts, periodic mowing or prescribed burns and maintenance of the wetland impoundment.
- Consider using herbicides to control exotic plants or to create the desired vegetative composition when other natural or mechanical methods are not effective.

Area 3 - Recreation Management Prescriptions:

- Close the primitive roads within this area to motorized use except to facilitate resource management activities. These roads would be open to hunters and other non-motorized recreators for walking only and may be periodically mowed.

- Maintain the high quality game species habitat for hunting recreation.

- Maintain the existing snowmobile and winter ATV trail that passes through this area and crosses the Brule River via the Co-op Park Bridge.

THE BRULE RIVER ECOSYSTEM

The Brule River Ecosystem includes the Bois Brule River, its tributaries, the Brule Spillway and Brule Bog. The Bois Brule River valley and the uppermost St. Croix River valley were carved by meltwater that flowed south from glacial Lake Superior and the surrounding uplands. When the glaciers receded, a divide was formed out of which the Brule and St. Croix Rivers flow today in opposite directions. The Brule flows into Lake Superior while the St. Croix flows into the Mississippi River system.

The Brule is 45 miles long from its source to the mouth of Lake Superior. This river begins in the biologically rich area of conifer swamps known as the Brule Bog. Along its course, the river is fed by numerous springs and tributaries, running cold and clear with a steady flow. From the slower flatter upper reaches of the Brule, the river falls 420 feet from its source to Lake Superior, resulting in numerous rapids and ledges. These attributes help give the Brule a reputation as an excellent coldwater fishery and canoeing stream. The river ends its journey as a 35 acres marsh and lagoon at the Lake Superior shoreline.

The undeveloped condition of most of the land bordering the Brule River and its tributaries is important to the rivers high scenic and ecological values. The Brule River watershed encompasses 128,000 acres (Lake Superior Basin Water Quality Management Plan 1998). Land ownership in the watershed is divided between private land (43%), state land (29%), county land (17%) and private industrial forests (11%) (Rissman et al. 2002). The upper half of the watershed lies in rolling sand hill topography of the Bayfield Sand Barrens and the lower half runs through the red clay soils of the Lake Superior Clay Plain. The soils within the watershed influence both the water quality and water quantity in streams, and the difference is evident in the upper and lower watersheds. The sand soils permit rapid infiltration of precipitation and ready movement of groundwater that provides the relatively stable base flow of the upper watershed. The clay soils have low permeability, causing rapid surface runoff of precipitation and high flow rates during short durations.

The Brule is known for its excellent water quality (Koshere 1998). Water quality can be represented by chemical, physical or biological parameters. With the Brule ecosystem all of these describe a high quality water system. The Brule has an extensive historical sampling base for water chemistry for a period from 1973 – 1994. These data show very consistent values and indicate good water chemistry. Physical parameters indicate a consistent flow and temperatures that support the quality trout stream classification. Biological monitoring is perhaps one of the best overall water quality monitoring methods, as this kind of monitoring integrates stream conditions over the life cycle of fish or invertebrates (Dubois 1993). An aquatic organism can survive and be present only if its most critical life cycle conditions are met all of the time. Both aquatic invertebrate and fish monitoring indicate that the Brule River has excellent water quality.

The wetland and aquatic systems of the Brule Bog and Spillway are in a unique ecological and hydrological setting because they are at the headwaters of both the St Croix and Brule River watersheds (Bartelt et al. 1999, Epstein et al. 1999). The wetlands, springs, spring ponds and

streams within this area support many rare plants and invertebrates. In addition, the downstream water quality and quantity is dependent upon the integrity of these upstream wetlands. The lowland coniferous forest is comprised of a mixture of northern white cedar, tamarack, black spruce, and balsam fir. Development and maintenance of an old growth lowland forest in this area has good potential but poor reproduction of white cedar is a concern (Mossman et al. 1997, Epstein et al. 1999, Eckstein et al. 2001). This forest supports a number of bird species normally found in forests further north and is known by bird watchers as a unique area. However, the severe hailstorm in August of 2000 may radically alter forest composition in areas within and adjacent to the bog as a result of high tree mortality.

Canoeing/Kayaking Resource

The Brule River offers beautiful scenery and rapids, ranging from Class I to Class III (high-water), which are ideal for canoeing and kayaking opportunities. Average river width ranges from 40-50 feet near Stones Bridge to over 100 feet at the mouth. There are several "lakes" in the upper stretch of the river that provide additional variety. The upper 26 miles of the river are gentle and easy, dropping at an average rate of 3 feet per mile. However, the lower 18 miles are lively and challenging, dropping sharply to Lake Superior at a rate of 17 feet per mile.

The Bois Brule River is one of the most favored paddling destinations in Wisconsin. The variety of water appeals to paddlers of all abilities. It offers easygoing trips on the upper river, particularly from Stones Bridge to Winneboujou that nearly anyone can handle. More adventurous folks can stay on the river another 45 minutes and experience Little Joe Rapids, a modest class II rapids that is located just upstream of the Bois Brule Landing. Still more daring canoeists, and most kayakers often prefer the river north of Pine Tree Landing. This stretch of river has class II to III Lenroot Ledges and Mays Ledges and near constant riffles and minor rapids.

The physical conditions, ready public access and scenic setting have made the Brule River a popular canoeing/kayaking destination for decades. Ten public canoe landings and a local private canoe/kayak rental and shuttle service offer convenience for river visitors. About 40-50% of the paddlers use the services of the canoe rental business located in Brule. This offers an opportunity to help educate paddlers regarding behavior expectations on the river. Summer weekends and holidays on the popular Bois Brule River often mean crowding at access sites. For paddlers, the Bois Brule River stands out as one of Wisconsin's most scenic and enjoyable rivers. An estimated 42,000 canoe and kayak visits are recorded annually.

Fishery Resource

The Bois Brule River is one of Wisconsin's most famous and scenic trout streams. The Brule has attracted fisherman locally, regionally and nationally, even serving as a retreat for several U.S. Presidents and other dignitaries. Today, the Bois Brule River draws an estimated 33,000 fisherman annually. Due to its size, a steady flow of cool spring water, and its highly productive, self-sustaining fishery, the Brule is considered one of the premier trout streams in the lake states. (Pratt 2000) Public access to the river is provided at boat launch sites and parking lots as part of the Brule River State Forest recreation program.

At the time of European settlement (1850s) the Brule was already regarded as one of the finest brook trout fishing streams in the state (Pratt 2000). Brook trout are the only salmonid native to the Brule. Two different brook trout life histories were present originally with the great majority being stream resident (those spending their entire lives in the river). Lake run brook trout (coasters) were also present to a minor extent in the very early history of the fishery but have been only occasionally seen since the late 1880s. Anglers have been continuously concerned about the declining condition of the Brule fishery since the 1890s. In response to the fishery decline locals added non-native rainbow trout and brown trout beginning in the 1890s. Angler over-harvest has long been the major limitation to conservation of good fishing in both the resident and lake run portions of the fishery.

Active fisheries management programs include stocking and evaluations, instream trout habitat improvement, and salmonid population monitoring and sea lamprey and beaver control. The trout stocking that began in the 1890s was, for the most part, curtailed in the early 1980s. The present strategy for sustaining and enhancing trout populations is to improve their ability to increase their populations naturally through active management to improve both spawning habitat and living space. Depositing gravel in the stream bed and installing large woody debris are examples of active management covered by this master plan. Beaver populations are being controlled on the upper reaches of the stream and tributaries in order to provide trout access to spawning areas and to protect the quality of instream trout habitat. Salmonid populations are monitored by electrofishing, video monitoring and angler creel census.

The river has two distinct fisheries (Watkins et al. 2001). One features a resident population of brook, brown and rainbow trout located primarily in the river's upper half, upstream of State HWY 2. The other is a Lake Superior-run (migratory) salmonid population (i.e. steelhead, brown trout and coho salmon) downstream of HWY 2. This fishery attracts the bulk of the angling attention. More than 80% of the fishing trips target the lake-run fish, primarily during the spring and fall fish runs.

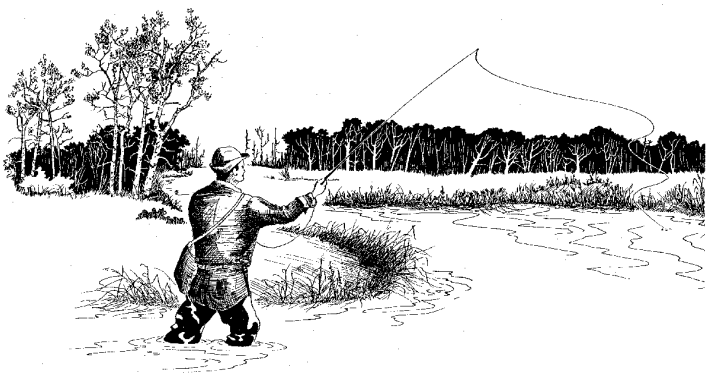
The upper Brule River and tributaries support the largest naturally reproducing population of brook, brown and rainbow trout of all the Lake Superior tributaries in the region. Water temperatures and flows here remain highly uniform throughout the year. Some of the best fly-fishing occurs in the stretch between CTH S and CTH B. This reach of the river is slow and wide, punctuated in places by small rapids and riffles. Heaviest fishing pressure occurs in May and June. Annually, an estimated 6,000 fishing trips target the upper river's resident trout.

The lake-run fishery, primarily north of HWY 2, targets steelhead (rainbow) and brown trout and Coho and Chinook salmon. This action occurs in the early spring, but picks up again in late summer with the arrival of lake-run brown trout followed by salmon and a larger run of steelhead in the fall. Crowds of anglers line the banks at peak times hoping for a chance to hook one of the big fish. Overall, Brule angling activity is heavily directed at the lake-run fish on the lower river, with an estimated 27,000 trips annually, or over 80% of the total fishing trips on the Brule. The fishing season on the lower river, geared to the lake-run fishery, is much longer than the general

fishing season. The season currently opens on the last Saturday in March and continues through November 15 per NR20.20(16).

A sea lamprey barrier was constructed in 1986 as part of an international effort to control lamprey in the Great Lakes and is operated on the river's downstream end. This structure prevents adult sea lamprey from swimming upstream (where they would reproduce) and reduces the Lake Superior population of these non-native fish parasites.

The Brule River ecosystem provides opportunities for continued management of significant scenic resources, a high quality fishery, popular canoeing/kayaking recreation, an aquatic system with excellent water quality, and unique stands of conifer and shrub swamps which support rare species.



Area 4

Brule River
Scenic Management Area

The Bois Brule River Scenic Management Area stretches approximately 16 miles from CTH B to the mouth of the river at Lake Superior. This management area has significant scenic, biological and recreational resources that will be well supported by this designation. The management area includes several distinct management aspects or areas that will be discussed separately. These include the scenic river corridor, eastern border forest, river recreation, fish habitat, lamprey barrier, Copper Range campground and the Bois Brule Campground.

At the narrowest stretches this management area generally contains the lands on both sides of the river up to the top of the slope where a change in habitat type is recognized. It includes all of the canoe landings with their accessory facilities north of HWY B, including parking areas, restrooms, signage, etc. and the angler parking lots located at various points along the river's course. This area is approximately 5,200 acres in size with 4,000 acres in state forest ownership.

Area 4 - Recreational Use Setting Subclassification:
The River Scenic Management Area would be managed overall as a Type 3 non-motorized recreational use setting. The objective for a Type 3 setting is "to provide readily accessible areas with modest recreational facilities offering opportunities at different times and places for a variety of dispersed recreational uses and experiences" (NR 44.07). The section of the river extending from the boat landing at the mouth to Lake Superior to the weir would be managed as a Type 3-motorized recreational use setting. While the Copper Range and Bois Brule campgrounds would be managed as a Type 4 – rustic facilities.

Area 4 – Scenic River Corridor
The scenic corridor includes all the public lands on both sides of the Brule River from Lake Superior upstream to CTH B where it joins the Brule Bog and Spillway Native Community Management Area. Forest covertypes vary through this area with common types being ash and alder dominated floodplain forest, upland aspen, mixed aspen/fir forest, boreal mixtures of pine/hardwood/fir/spruce, and northern hardwood forests. Along each side of the river the management area extends to a management line corresponding to the topography and vegetation change found where the slopes leading to the river flatten out to a more level upland or a minimum of 400 feet from the river's edge whichever is greater. It should be recognized that not all river shorelands are part of the state forest and some private owners maintain lawns, buildings and other settings.

Area 4 - Scenic River Corridor – Long and Short-term Management Objectives:

- Maintain the natural scenic quality of the river with a conifer dominated older forest corridor.
- Manage public access areas to support use of the river but not detract from the scenic quality.

Area 4 - Scenic River Corridor - Authorized Management Activities:

All activities will be conducted to maintain a scenic and safe experience for recreational users and will not be conducted for natural community management. Maintenance of public use facilities, exotic plant control, erosion mitigation, hazard tree removal, and salvage harvests would occur if deemed necessary to maintain the scenic and safe nature of the management area.

Area 4 - Scenic River Corridor – Resource Management Prescriptions:

- No ongoing active management (timber harvest/ground disturbance) would occur within this corridor. The only timber cutting that would occur along the river would be done to provide a safe and scenic experience to users of the forest and river.
- Maintain the approximately 35 acre "Brule River Marsh and Lagoon" complex in a healthy natural condition with no further developments.
- Maintain existing public use access and recreation areas consistent with the overall scenic character of the management area. These sites are detailed in the river recreation section.
- Monitor for exotic plant infestations and use control methods appropriate to the species and infestation threat. These methods may include mechanical removal, herbicide applications or biological control.

Area 4 - Eastern Border Forest

The eastern border forest begins 0.5 mile south of CTH FF and includes lands between the top of the eastern slope of the river corridor area and the eastern property line south to HWY 2. South of HWY 2 it includes lands from the top of the eastern slope of the river corridor area east to HWY 27 and south to where the Little Bois Brule River meets the main channel. This excludes lands surrounding the administrative area containing the Brule Area Office and fish hatchery.

Most of this narrow section of the management unit is within the Lake Superior Clay Plain and has similar ecological condition and history to the forest described in that section. However, in this section forest management will be conducted with an emphasis on developing and maintaining a forest for scenic resources rather than a specific ecological condition.

Area 4 - Eastern Border Forest - Long-term Management Objectives (100 years):

- Develop a forest of older trees dominated by conifer species to promote a scenic setting between the river corridor and the public roads.
- Manage public access areas to support use of the river but not detract from the scenic quality.

Area 4 - Eastern Border Forest - Short-term Management Objectives (50 years):

- Increase the covertype of white pine and fir-spruce by 50%.
- Establish white pine, white spruce and white cedar in areas lacking these species.
- Explore management opportunities to reduce area of alder in favor of other wet soil species such as white cedar and tamarack.

Area 4 - Eastern Border Forest – Authorized Management Activities:
Depending on the existing community type, different management activities will be used to manage the forest toward the same future desired condition of a scenic older conifer forest. Activities may include passive management, patch cuts to facilitate planting of conifers, shelterwood, seed tree, selective harvests, planting and site preparation, exotic plant control and maintenance of existing public access areas.

Area 4 - Eastern Border Forest – Resource Management Prescriptions:
As appropriate for the specific site, existing ecological communities, and scenic resources, the following management prescriptions will be used to achieve the long-term and short-term objectives identified above.

- Encourage existing aspen stands to convert to a more boreal mixture of conifers through a combination of active and passive management. Harvest areas would be small in size (10 acres or less) and irregularly shaped to blend into the landscape. Where necessary the harvest areas would be replanted or seeded with boreal conifers (white pine, white spruce, and white cedar). Any harvest areas greater than three acres in size will involve leaving a minimum of 40% crown closure as a residual stand to discourage aspen regeneration. In general, small (< three acres) patch clearcutting methods would be used to encourage the development of mid to shade tolerant species.
- Harvest operations would be limited to frozen or dry ground conditions.
- Manage the existing hardwood types (primarily oak and poor quality northern hardwood stands) through light thinning on a periodic basis designed to promote the growth of large diameter trees. Long-lived species such as oak, sugar maple, and pine species would be encouraged within this management unit for their aesthetic qualities. Regeneration treatments on these stands will be done with small (< three acres) patch clearcutting methods to encourage species such as fir, oak, pine and spruce.
- Periodically thin pine plantations in order to create a density of large diameter trees with a natural appearance.
- Grow pine on extended rotations (150+ years of age) using natural regeneration systems to produce a new stand of trees.
- Whenever appropriate use “shelterwood” harvesting to regenerate stands, as this system leaves a large number of trees to minimize the visual impact.
- Plant a native mix of trees when natural regeneration fails, avoiding straight row look.
- In the event of a catastrophic event such as a major windstorm, fire, or flood, use timber salvage operations to clean up the areas affected by the event.

Area 4 - River Recreation
This section of the plan outlines the management related to public use and recreation facilities in and adjacent to the Brule River. It includes, the river itself, the angler parking areas, canoe landing, trails and roads within the Brule River Scenic Management Area (Refer to the Land Classification map in the Maps Section at the back of this document).

The designated canoe landings are located on the river to provide trip lengths from half an hour to multiple days. State campgrounds are located at Bois Brule Landing and Copper Range Landing. These campgrounds provide an opportunity for paddlers to start at the headwaters and camp several nights as they follow the river to its mouth at Lake Superior. Camping along the river is prohibited on state land except at the two designated campgrounds.

A significant number of river paddlers are members of an organized group outing. Scouts, schools, churches, families, universities, and other organizations are attracted to the Brule. This can create conflict as large groups, frequently with a variety of skill levels and organization, spread out and noisily travel down the river (Watkins et al. 2001). Conflict is not infrequent between paddlers and anglers and paddlers and private landowners. Typically this conflict is only minor irritation but occasionally it has escalated.

Public input received concerning river recreation has been mixed but overall there is support for increased recreational management on the river. Fishing regulations are not set by this plan but will continue to be administered through the fisheries program. The following objectives and actions are designed to maintain an enjoyable experience for visitors and residents.

Area 4 – River Recreation - Long-term Management Objectives (100 years):

- Maintain the scenic quality of the Brule River while supporting public use.
- Provide recreational opportunities for viewing, angling, canoeing, and kayaking. All these activities have a long and rich history on the Brule River and have a place in its future. Implicit in the objectives is to manage the relationships between these user groups.
- Monitor and manage recreational use to assure compatibility with the natural resources and recreational facilities.

Area 4 – River Recreation - Short-term Management Objectives (50 years):

- Continue to provide similar level of angler access through 18 parking lots and trails. Improve some conditions such as surfacing or erosion prevention as needed. (Refer to the Recreation map in the Maps Section at the back of this document)
- Reduce conflicts related to river recreation through increased education, user management and law enforcement.
- Improve the facilities at the landings to address resource damage and user conflict issues.
- Provide additional day use scenic viewing areas for drivers along the river.
- Maintain the public use facilities at the mouth of the Brule.
- Increase the visitor awareness of the ecology and history of the Brule River area.

Area 4 – River Recreation – Recreational Use Setting Subclassification:
The River Recreation facilities will be managed to generally create a recreational setting consistent with a Type 3 non-motorized recreational subclassification.

Area 4 – River Recreation – Authorized Management Actions:
Construction and maintenance of access roads, parking lots and boat landings, construction and maintenance of interpretive exhibits, development of water supply wells, construction and

maintenance toilet facilities, construction and maintenance of trails, and erosion mitigation measures.

Area 4 – River Recreation – Recreation Management Prescriptions:

- Interpretive wayside exhibits would be developed at designated canoe landings. These would be multi-panel exhibits produced in a durable media to withstand the weather. They would be installed into a roofed kiosk that also provides bulletin space for presenting more timely information like seasonal messages and emergency information.
- Interpretive kiosks that inform and entertain will be placed at each canoe landing and landing hosts will be used at busy landings to help orient paddlers to the river and what is expected of them. Additional Rangers will also be used to reinforce this message and reduce conflicts on the river.
- One of the most frequent complaints about behavior on the river relates to the lack of restroom facilities. Drinking water wells and pit toilets would be provided at the most popular landings. The well at the Mouth of the Brule picnic area would also be replaced. The landings that will have new facilities include:

  Wells: Stones Bridge, Bois Brule, Pine Tree, HWY 13, Mouth of the Brule
  Toilets: Bois Brule, HWY 13 (replacement)

- Additional research will be conducted to provide the necessary information to manage use levels and conflicts among users of the river. Research will be done to measure the quantitative and qualitative use of the river. This information will be used to develop actions to reduce conflicts between users. Data will be collected regarding the distribution of participants by location and time along the river, the size and nature of their group, whether they use commercial services to facilitate their trip, their motivations and expectations, and the nature of conflicts perceived by the user groups and adjacent landowners. Survey instruments will be developed and river monitoring and surveillance will be used to develop this data set.
- A user education program incorporating ethics, sensitive natural resources, ways to avoid conflicts between users, and respect for private lands will be implemented through interpretive kiosks, audio and video tools and direct contact by rangers and naturalists.
- All landings would be posted as quiet zones in compliance with NR45.04 (3)(k).
- Maintain the picnic area as a Type 4 rustic area with parking for 30 cars, 10 picnic tables, toilet facilities, water source and small motorized boat landing at the mouth of the Brule.
- The picnic area at the mouth of the Brule would generally be maintained as is. The existing well has failed to provide acceptable water samples after repeated treatments. This well will be abandoned and a new well constructed.
- Short primitive access trails have existed along the river for generations. Used primarily by anglers, they create concern over erosion. Such trails on state land would be surveyed for condition and erosion control methods like waterbars and steps may be installed to mitigate damage from heavy foot traffic and erosion. These trails would have appeal to hikers if they were identified and maintained. Materials would be used from on-site to maintain a rustic feel to the trail and labor would be provided by WCC or DNR work crews.

- The Brule River Scenic Management Area also includes the 18 angler parking lots and the angler trails that provide access from the lots to the river. These lots have gravel surfacing and include no other facilities. These lots would be maintained at their current size. The gravel surfaces will be maintained and signs will be installed at each of them that will include a property map, the general rules of the river and property, and a graphic to assist with identification of the species of trout and salmon in the river.
- Construct a scenic overlook at Waino Rock, located on the west side of CTH H approximately one-half mile south of CTH FF. A small, six to eight car parking lot would be constructed along the west side of CTH H and a trail would be built; extending approximately 300 yards west to the Waino Overlook (the Promontory). This half-mile trail would be a five-foot wide, lightly developed hiking trail with primitive surfacing and minimal grading. The trail would lead through a combination of open and wooded areas to a large rock outcrop, which would serve as a viewing area and provide natural seating. The panoramic view from the overlook extends to the west across the Brule River Valley; on clear days extends north to Lake Superior. The scenic quality of the overlook area would be kept natural and no additional facilities would be provided. A 25-foot wide buffer of existing vegetation would be maintained between CTH H and the parking area providing a visual buffer.
- The river would continue to be closed by state statute to all inflatable devices including innertubes, fishing rings, rafts, inflatable kayaks, and others.

Area 4 –Fish Habitat Management

The development and maintenance of habitat for salmonid species within the Brule River system is important to the high quality sport fishery. This work is planned and conducted by fisheries management staff. As part of the Department's integrated management planning these management actions are also described in property master plans. This description covers all instream fisheries habitat work conducted within the Brule River system.

Area 4 – Fish Habitat Management - Long-term Management Objectives (100 years):

- Provide a high quality, naturally reproducing and self-sustaining trout and salmon fishery. In order to ensure that the population is self-sustaining, it is critical that water quality be maintained, and adequate high quality instream habitat exists to support spawning and all other life stages for the several species of salmonids which coexist in the river.
- Continue to provide a high quality angling experience for both lake run and resident salmonids.

Area 4 – Fish Habitat Management - Short-term Management Objectives (50 years):

- Continue to identify sites where habitat restoration or improvement could benefit the fishery, without impacting the natural scenic quality of the site and continue to apply the appropriate habitat management techniques to those sites.

Area 4 – Fish Habitat Management – Authorized Management Actions:

In addition to stocking and harvest regulation, past fishery management actions have included numerous habitat modification techniques. Gravel, rock, and woody debris have been placed into

the stream in order to improve and restore cover and spawning habitat. Beaver control and dam removals have been used to ensure that fish have access to high quality spawning areas. Stabilization of eroding or slumping streambanks has been used to reduce sedimentation. The authorized management actions and prescriptions also apply to appropriate sites within Management Area 5.

As flowing water systems can be very dynamic, changes are to be expected. Both natural and human induced events can have serious negative impacts on instream habitat. These fishery management techniques can be used to prevent and minimize impacts, as well as to speed the natural recovery processes after impacts have occurred. We anticipate using these techniques, as needed to protect, maintain and improve the water quality and instream habitat.

Area 4 – Fish Habitat Management – Resource Management Prescriptions:

- Sites where banks become unstable due to serious erosion or slumping will be stabilized and repaired.
- Instream additions or removal of gravel, rock, large woody debris or other materials will be made to improve salmonid spawning or living conditions, on a site-by-site basis. These modifications will only be undertaken if it will not create a hazard or degrade the scenic quality of the location.
- Downed and fallen trees in the river that provide important fish habitat but are not deemed safety hazards to navigation will be left in the river.
- Continue instream maintenance of restored fish habitat areas (gravel additions, log habitat, etc.)
- Continue to control beaver populations on the tributaries to protect fish habitat and assure fish movement. Beaver control should only be considered on designated trout water and specific ecologically sensitive sites. Actual removal should only be done for resident beaver as evidenced by beaver houses, lodges, or bank dens and not during spring dispersal that is critical to allow beaver to travel throughout the area and settle in other suitable sites.
- Conduct Hilsenhoff Biotic Index monitoring every 3 years to assure that high water quality is maintained on the Brule River and tributaries.

Area 4 - Lamprey Barrier

The Lamprey Barrier is a concrete and steel structure that was constructed in 1986 to prevent adult sea lamprey, a non-native species, from swimming upstream, where they would reproduce and significantly degrade the Lake Superior fishery. The area described here includes the structure itself, the access road and the area of the river surrounding the structure. The approximate size of this area is 10 acres. The Lamprey Barrier is located on the Brule River about 1 mile north of HWY 13.

Area 4 – Lamprey Barrier - Management Objectives:

The short-term and long-term management objective for the Lamprey Barrier is to maintain this site to control the invasive non-native sea lamprey and to facilitate future study of the fishery.

Area 4 – Lamprey Barrier – Authorized Management Activities:
Conduct general road maintenance, mowing, brushing and structure maintenance.

Area 4 – Lamprey Barrier – Management Prescriptions:
- Maintain the structure and access road to allow its continued use and up-grading as necessary.
- Discourage access to this site for non-scientific purposes.

Copper Range Campground
The Copper Range Campground is located four miles north of HWY 2 on CTH H (Refer to the Recreation map in the Maps Section at the back of this document). The foot print of the existing campground is approximately 10 acres in size, however the management described here includes approximately 30 acres and would include the adjacent canoe landing. All 17 existing campsites are universal. There is a single contemporary pit toilet and a hand pump to serve the campground. The campground is popular with anglers in the spring and fall and is filled on many weekends in the summer. It is located convenient to favorite fishing holes and canoe routes. A canoe landing is located a short walk from the campground. Research and comments have indicated that campers value this campground for its rustic character. Research also indicated that campers highly value secluded campsites and rustic facilities, which would not include electric hookups, flush toilets, or showers. (Watkins et al. 2001).

Area 4 – Copper Range Campground – Long-term Management Objectives (100 years):
- Manage this site to provide a rustic and scenic camping experience that provides sufficient services to maintain a safe and enjoyable experience for users.

Area 4 – Copper Range Campground – Short-term Management Objectives (50 years):
- Maintain a campground which provides 15-20 sites for a rustic camping experience.
- Evaluate and implement a campground layout which would increase the vegetation screening and space between campsites.
- Improve the water supply facilities to provide a safe, dependable water source.

Area 4 – Copper Range Campground – Recreational Use Setting Subclassification:
The Copper Range Campground would be managed as a Type 4 rustic campground.

Area 4 – Copper Range Campground –Recreation Management Prescriptions:
- Electrical hookups are specifically prohibited in the campground except to facilitate a campground host site and to operate a pressurized water supply.
- Flush toilet and shower facilities are specifically prohibited.
- Remove the boulders and posts used to define the limits of the campsites. Sites would be defined by plantings and pad maintenance, in keeping with the natural qualities and rustic character of the area.
- Wells would be converted to a pressurized system in order to provide more consistently safe water samples.

- Potential steps to provide greater spacing in the campground include; eliminating 3-5 campsites and replacing with as many as 3 walk-in sites located to the south side of the campground. One of the eliminated sites would be converted to a small parking area to serve these sites. Toilets and water would be provided in the Copper Range Campground.
- A link to the Old Bayfield Road Trail across the Coop Park Bridge will be established as described in the Management Area 2 description.
- The Copper River Campground has a diverse age and species structure. Vegetative management would focus on annual removal of diseased and defective trees and occasional (1-5 year interval) removal of selected trees to release the understory. The goal is to maintain an all-aged stand that provides privacy between campsites. Planting may be done to enhance this with species that are not highly favored by deer for browse.
- Vegetation would be managed consistent with the scenic river corridor described above to provide a safe and scenic recreational experience. Trees that are considered hazards because of damage or structural deterioration are regularly removed from public use areas for safety purposes. If needed to achieve the rustic and scenic goal for this campground, native vegetation may be planted in and around the campground.

Bois Brule Campground

The Bois Brule Campground is a 23-unit rustic campground located between the Bois Brule River and Ranger Road just north of BRSF Headquarters (Refer to the Recreation map in the Maps Section at the back of this document). This area is approximately five acres in size. It has 19 existing universal campsites and four walk-in campsites. The campground is popular, filling most weekends during the summer. One pit toilet constructed in 2000 and another pair of pit toilets of a late 1960s vintage serve the campground. There is a single handpump. Research and comments have indicated that campers value this campground for its rustic character. Staff observations and the *Recreational Supply and Demand Assessment* indicate concerns about crowding and future camper increased demand (Watkins et al. 2001). The Stoney Hill nature trail is adjacent to the campground and could be important to the need to educate the public about the cultural history of the Brule River Valley. This was identified in the *Environmental Education and Awareness Assessment*, as well as by the Brule River State Forest staff and the public (Fannucchi et al. 1998). Adjacent to the campground is a picnic area and canoe landing.

<u>Area 4 – Bois Brule Campground – Long-term Management Objectives (100 years):</u>

- Manage this area to provide a rustic and scenic camping and recreational experience that provides sufficient services to maintain a safe and enjoyable experience for users.

<u>Area 4 – Bois Brule Campground – Short-term Management Objectives (50 years):</u>

- Maintain a campground that provides 20-25 sites for a rustic camping experience.
- Evaluate and implement a campground layout that would increase the vegetation screening and space between campsites.
- Develop a group campground area for up to four groups of a maximum (20 persons per group) to reduce group camping pressure on the two existing campgrounds. The group camp

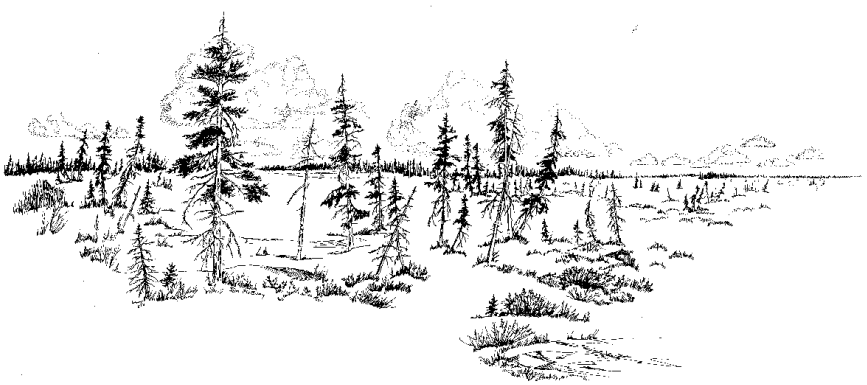
facility would be sited to provide spacing and vegetation buffering between the four group sites and between the campsites and the access road.
- Improve the water supply facilities to provide a safe water source.

Area 4 – Bois Brule Campground – Recreational Use Setting Subclassification:
The Bois Brule Campground - Recreation Management Area would be managed as a Type 4 rustic campground.

Area 4 – Bois Brule Campground – Management Prescriptions:
- Vegetation would be managed consistent with the scenic river corridor described above to provide a safe and scenic recreational experience. Trees that are considered hazards because of damage or structural deterioration are regularly removed from public use areas for safety purposes. If needed to achieve the rustic and scenic goal for this campground, native vegetation may be planted in and around the site.
- The Bois Brule Campground is dominated by a canopy of red pine planted around 1918 as part of the Stony Hill Plantation. Shade and heavy use adjacent to the campsites have diminished the amount of brush and the campground has an open understory. Annual removal of diseased, defective and selected mature trees would gradually expose the undergrowth to sunlight and increase vegetation growth and their screening effect. By performing this operation annually the potential for windthrow is reduced. The removal of trees would be performed by property staff. Five to ten trees would be removed each year in addition to the diseased and defective trees. The removed trees would be used for firewood in the campground or for construction projects on the property in the style of the CCC era.
- As many as five campsites could be eliminated where they are too close to other sites or restrooms. The capacity from these sites and other sites removed in Copper Range would be replaced by the group campground.
- Construct a group camp facility north of the current Bois Brule Campground. (Refer to the Recreation map in the Maps Section at the back of this document) This facility would consist of four distinct sites, each capable of accommodating 20 people. There would be a central parking area for 20 cars, a pit toilet and a pressurized water supply connected to the well in the Bois Brule Campground.
- The Stony Hill Nature Trail is located adjacent to the campground. This trail would be re-labeled with the interpretive theme of the unique cultural history of the Brule River Valley, including the significant contribution of the CCCs stationed at the Brule CCC camp. The trail will be managed as a moderately developed hiking trail.
- The Stony Hill Nature Trail could be used as a trail link to connect the campgrounds with the fish hatchery, ultimately linking the headquarters, the North Country Trail, and the group campground. These trail linkages would provide greater access and mobility to hikers and other non-motorized recreators.
- Electrical hookups are specifically prohibited in the campground except to facilitate a campground host site and to operate a pressurized water supply.
- Flush toilet and shower facilities are specifically prohibited.

Area 5

Brule River Bog and Spillway Native Community Management Area



Refer to the Land Management map in the back of this document to locate the Brule River Bog and Spillway Area. This management area occurs within the larger Brule River System ecological landscape. This area, including both private and state owned lands, is approximately 6,300 acres in size. The state owned land covers 5,300 acres. It extends to the top of the slopes adjacent to the Bog leading out of the valley on both sides of the river from Upper St. Croix Lake to CTH B on the Brule River. Primarily, this management area consists of the spillway and bog area adjacent to the river and the surrounding lowland forest associated with the river. The Brule Glacial Spillway State Natural Area encompasses about 2,510 acres of this management area. (Refer to Brule River State Forest State Natural Areas and Map in the back of this document)

As described above this area is an ecologically rich site and important to maintaining the water quality and quality of the Brule River ecosystem (Bartelt et al. 1999). It also has historic significance as the early portage route between Lake Superior and the St. Croix River. The primary management needs involve periodic monitoring of the water quality and plant composition to assuring the long-term sustainability of this area (Epstein et al. 1999). Potentially significant ecological changes to the current condition could come from exotic plant invasion, large-scale wildfires or the continued poor regeneration of white cedar. Conditions related to these issues will be monitored and additional research or action will be implemented as indicated by the monitoring results. Several upland ridges are also located within this management area near the headwaters of the East Fork of the Brule and the forest consists of red pine plantation, jack pine and aspen.

This management area provides several recreation elements. The upper Brule and tributaries support trout fishing and canoeing. These activities are supported by three landings. This area also supports the historic portage trail and a portion of the North Country Trail. These facilities are all north of CTH A.

The St. Croix Picnic Area is located on the north end of St. Croix Lake and is accessed from CTH A. It has a flowing artesian well, a contemporary pit toilet, a single lane boat landing, parking space for about 10 vehicles and three vehicle/trailer combinations. A small informational kiosk is located adjacent to the boat landing and a short distance north on CTH A is located a historic marker explaining the role of the Historic Portage Trail. There is a small gravel pull-off at the historic marker.

The boundaries, descriptions, objectives and prescriptions for the Brule River Spillway State Natural Area are detailed in the State Natural Area section in the Appendix and the Brule River State Forest State Natural Area Map in the map section at the end of the document.

Area 5 – Brule River Bog and Spillway – Long-term Management Objectives (100 years):

- Maintain a high quality forest and shrub wetland system for ecological, water quality, and habitat values. The vegetation would be characterized by shrub wetlands and lowland forest associated with the river; composed of a mixture of northern white cedar, tamarack, black spruce, and balsam fir.
- Develop and maintain a natural upland forest (red pine, jack pine and aspen) on several ridges located within the area near the headwaters of the East Fork of the Brule.
- Protect the water quality of wetlands, springs, spring ponds and streams within the management area.
- Maintain the existing levels of public use access and facilities with a rustic setting. Maintain the overall scenic nature of the river, wetlands and forest.
- Prohibit any utility corridors through this management area.

Area 5 – Brule River Bog and Spillway – Short-term Management Objectives (50 years):

- Conduct research to determine the impact of the loss of white cedar on other biota and successful methods to regenerate white cedar in forested wetlands.
- Develop a monitoring strategy for the aquatic community, forest composition and exotic plants.
- If significant evidence of exotic plants is found, implement control activities.
- Maintain the existing three landings and trails within the management area.
- Improve the rustic look and facilities of the St. Croix day use and boat launch area.
- Continue to identify sites where habitat restoration or improvement could benefit the fishery, without impacting the native community qualities and continue to apply the appropriate habitat management techniques at those sites.

Area 5 – Brule River Bog and Spillway – Authorized Management Activities:

Timber harvest to thin existing pine plantations, exotic plant control activities, maintenance of existing roads and public use access, mowing and brush cutting in existing public use areas, development activities necessary for stated improvements to public use facilities, and monitoring and research activities. All authorized fish management actions and prescriptions, as described in Area 4 – Fish Habitat Management, are authorized and prescribed for Area 5 as well.

Area 5 – Brule River Bog and Spillway –Resource Management Prescriptions:

- Monitor for the presence of exotic plants. Exotic species to watch for in the bog area include glossy buckthorn and purple loosestrife. Implement cutting and limited herbicide use to control exotic plants.
- Monitor the forest composition and regeneration, specifically white cedar. Conduct research activities to learn more about regeneration of existing wetland conifers.

- No timber harvesting would be performed within the bog area except on the upland ridges where the existing pine plantations would be thinned in stages to create a more natural appearance and encourage a more diverse understory.
- Hazard tree removal and salvage harvests would be conducted if deemed necessary to maintain the scenic nature and provide for public safety.

Area 5 – Brule River Bog and Spillway – Recreation Management Prescriptions:

- Maintain the portion of the existing Historic Portage Trail that extends into the Bog Area as a moderately developed trail.
- Close the primitive roads within this area to motorized use except to facilitate resource management activities. These roads would be open to hunters and other non-motorized recreators for walking only and may be periodically mowed.
- Maintain existing canoe landings.
- Shoreline management on St. Croix Lake would be done to demonstrate best management practices to other waterfront owners.
- Vegetation would be managed to screen the picnic area from full view as well as to develop large trees to provide shade to the area.
- Continue to maintain the picnic area and boat landing as currently operated.
- The historic marker would be relocated to the picnic area to offer a better opportunity to pause and read the marker text as well as make a connection between the state forest and the protection of this important trail.
- A rustic, CCC era character would be developed in the picnic area through the use of round wood construction of picnic tables and benches, round wooden signposts, and rustic routed wooden signs in a historic font.
- The artesian well, a focal point of the area, would be fitted with an attractive wellhead and shelter that would reflect CCC era construction of similar sites.
- The Stone Chimney Road canoe landing would continue to provide parking for approximately four cars. A moderately developed trail would be maintained from the parking lot to the river. The trail has significant stretches of "corduroy" which has deteriorated and will be replaced.
- The landing at CTH P offers parking for two to three cars on the side of the road. Parking along side the road will continue to be permitted. No additional developments are suggested for this area.
- The St. Croix Picnic Area qualifies for a Type 4 recreation area. The St. Croix Picnic Area would provide parking for 10-15 vehicles and trailers. As many as 10 picnic tables would be provided. The boat landing and pier would continue to be provided and may need to be replaced during this planning cycle due to deterioration of the concrete landing. At that time the orientation of the landing would be reconsidered to provide the easiest access.
- A section of the North Country Trail would be constructed east of CTH P. It would pass through a part of the bog and cross to the west side of CTH P and then head toward Solon Springs.

THE BAYFIELD SAND PLAINS- ECOLOGICAL LANDSCAPE

Subsection 212Ka (National Hierarchical Framework of Ecological Units)

The Bayfield Sand Plains ecological landscape covers portions of six of the counties in northwest Wisconsin; Burnett, Washburn, Douglas, Polk, Sawyer and Bayfield (Refer to the Land Management Classification map in the Maps Section at the back of this document). This landscape consists of two distinctly different landforms: flat plains or terraces and hummocky sediments. Soils are deep loamy sands, low in organic material, which support dry forest and oak and pine barrens habitats and some agriculture in the southern part of the ecological landscape. These sandy soils have high infiltration rates and serve as important water recharge areas for lake and rivers (Brusoe et al. 2001).

Historically, barrens of jack pine, northern pin oak, and prairie grasses and forbs were the dominant vegetation on the southern two-thirds of the landscape, while red pine forests and jack pine barrens dominated the northern end in Douglas and Bayfield counties (Brusoe et al. 2001, Eckstein et al. 2001, Hacker et al. 2000). Jack pine was common on the fire-dominated pine barrens in the 1850s landscape. Adjacent to rivers and lakes, a slightly lower fire frequency likely favored red pine. Periodic fires, of lightning origin or set by Native Americans, historically maintained much of the Bayfield Sand Plains in a relatively open non-forested condition. Prior to European settlement, a large region along the southern flank of the BRSF boundary was characterized by no trees and at times was described by the government surveyors as "prairie." Most of this land along the southern boundary of the state forest is currently in private industrial forest land and managed as productive red pine plantations. This was the classic barrens ecosystem and contained grasses and forbs, but not with the lush, tall grasses of the more fertile prairies in southern Wisconsin. This open barrens area was, in fact, the largest such barrens opening in the entire northwestern barrens region and the largest open landscape north of true prairie in the northwest part of the state (Eckstein et al. 2001).

The current landscape of the Bayfield Sand Plains is dominated by tree species that grow well in this dry/sandy soil, disturbance dominated system (Brusoe et al, 2001, Schmidt 1997). The dominant land uses across the sand plains today are oak (29%) (scrub – also called northern pin, red and bur) for wildlife and forest products, early successional forests of aspen/birch (23%) for forest products and game species habitat, jack pine (14%) for forest products and wildlife habitat, red pine (12%) for forest products, and pine barrens for wildlife and ecological values. The percentage of barrens across this landscape is difficult to determine from available data but is likely less that 5% of the ecological region. Fire suppression and management for forest products are the dominant recent historical forces that have shaped the present forest-dominated landscape.

The relatively small area of current state forest ownership within this ecological landscape has opportunities for management of northern dry forests, northern dry-mesic forests, and pine barrens communities. However, the current size and shape of the property and dominant land uses in the surrounding landscape may limit a large-scale conservation opportunity (Bartelt et al. 1999, Eckstein et al. 2001). The portion of the BRSF within the Bayfield Sand Plains supports red pine (26%), aspen/white birch (24%), jack pine (16%), scrub oak (10%) and grass (2%).

Most of the remaining area consists of wetland communities. The Community Restoration and Old Growth analysis indicated an opportunity to restore various components of the 1850s natural community make up, including: a 400- to 600-acre shrub-dominated open barrens; scattered small stands of old-growth red pine; and large areas of managed jack pine forest (Eckstein et al. 2001). The current relatively small area of ownership in this ecological landscape provides the opportunity for maintaining sample of the pine barrens vegetation, but lacks the area necessary to create and maintain the multiple plant communities and seral stages for restoration at a landscape level. The ability to support sustainable populations of associated wildlife species is also compromised by the extent of current state ownership. Lands with the southern expansion area would be critical to achieving any landscape level management for barrens or dry pine forest natural communities.

Area 6

Afterhours
Recreation Management

The Afterhours Recreation Management Area is located south of HWY 2 and west of the Bois Brule River. This area, including both private and state owned lands within the project boundary, is approximately 2,000 acres in size with 1,200 acres in state forest ownership. It is across the river and directly west of the Ranger Station. The current forest cover in the Afterhours Recreation Management Area consists primarily of a deciduous and conifer mix. While it is within the Bayfield Sand Plains it is in a transition area among the three primary ecological landscapes within the BRSF. Its current condition and management objectives have resulted in a management prescription that favors the Mille Lacs Uplands potential for this area. However, it is included here to be consistent with its classification. It includes the Afterhours Ski Trail system, which is an extremely popular cross-country ski area well known for its excellent grooming and dependable snow coverage. The system is currently about 14 miles and is gently rolling. Parts of the trail travel along the old rail grade. The trail has easy and difficult entry loops and linking loops that are groomed for both classic and skate skiing styles. The *Recreational Supply and Demand Assessment*, as well as other input on existing recreational facilities such as the Afterhours ski trail, indicated a demand for more cross-country ski trails. (Watkins et al. 2001). Hiking, hunting, and snowmobiling are other land based recreational activities in this management area.

<u>Area 6 – Afterhours Recreation Area – Long-term Management Objectives (100 years):</u>

- Maintain a Type 3 recreation use setting for high quality cross-country skiing opportunities and snowmobiling in the winter and provide hiking and hunting opportunities during the other seasons.
- Maintain a mixed conifer/hardwood forest consistent with the ecological capabilities and the scenic recreational setting.

Area 6 – Afterhours Recreation Area – Short-term Management Objectives (50 years):

- Improve trail conditions and facilities to meet the current and projected demands of the cross-country skiers while maintaining the general rustic character of the management area. This would include tree harvest to expand the width of the trail, provide better and consistent grooming and provide additional restroom facilities.
- Assure regeneration of desired trees species with the goal of producing a scenic and diverse forest.

Area 6 – Afterhours Recreation Area – Recreational Use Setting Subclassification:

The Afterhours - Recreation Management Area would be managed as a Type 3 recreational use setting.

Area 6 – Afterhours Recreation Area – Resource Management Prescriptions:

As appropriate for the specific site, existing ecological communities and timber stand conditions, the following management prescriptions will be used to achieve the long-term and short-term objectives identified above:

- Establish a healthy stand of mature long-lived species with emphasis on northern hardwoods, red pine and white pine. Use primarily selection and shelterwood harvests to promote large trees and regenerate the desired species.
- Management would involve primarily small-scale actions (timber harvest, scarification, planting, prescribed fire, etc.) of two to five acres to maintain pine and oak components in this forest. These actions generally occur at one to two sites within a five year period and in the summer and fall months.
- Selectively harvest and remove diseased and defective trees to enhance the scenic quality of the area, particularly near trails.
- All slash within 100 feet of recreational trails will be treated to minimize their visual impact and at a height less than 24 inches.

Area 6 – Afterhours Recreation Area – Recreation Management Prescriptions:

- Provide the necessary vegetation maintenance along the trails to facilitate grooming and safe recreation.
- Provide existing levels of trail facilities, grooming and maintenance for cross-country skiing. These would be fully developed trails cleared 20 feet or more and maintained 16-20 feet wide.
- Interpretive signs will be placed along the trail describing the role forest management plays in providing recreation opportunities. For instance, most trails were built for forest management. Some of the trails were even rail grades from the early 1900s that served the timber industry.
- An Adirondack-style warming shelter would be constructed at a concealed location near a river overlook to provide a rest area and picnic opportunity.
- A pit toilet would be provided along the trail at a point roughly the furthest from the headquarters.
- Expand the Afterhours Ski Trail by building an additional loop.

Area 7

Administrative
Special Management Area

The administrative area encompasses the Ranger Station, CCC era garages, the maintenance garage, the wildlife and fishery garages, and the open area just north of the fishery garage. This area is approximately 400 acres in size. It is roughly one mile long, running from the end of Ranger Road nearly to HWY 27, and is just north of Stoney Hill. The Little Brule River is located within this area, as well as the Brule Fish Rearing Station.

Area 7 Administrative - Long-term Management Objectives (100 years):

- Maintain the structures and facilities in this area that provide functions such as forest headquarters offices, customer service to the public, garages, equipment storage and maintenance.

Area 7 Administrative - Short-term Management Objectives (50 years):

- Develop additional educational opportunities and customer services in association with the existing building complex.

Area 7 Administrative - Management Prescriptions:

Authorization of any modifications to WDNR administrative offices / buildings would be handled separately from the master plan under the WDNR facilities development process. Management actions, other than modifications to WDNR administrative offices / buildings, would include the following:

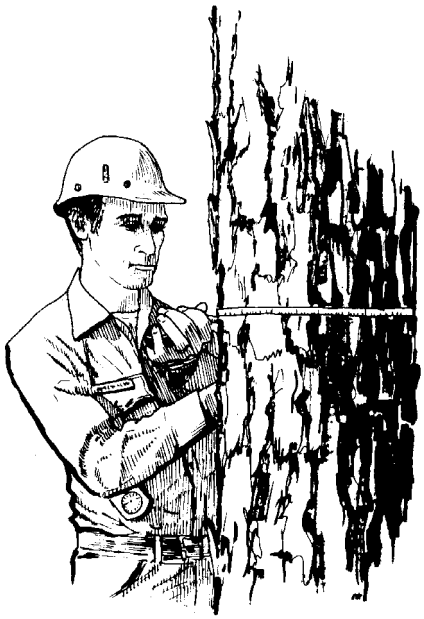
- Construct a rustic shelter on the terrace north of the headquarters building for use during education programs. Opportunities for such education facilities were identified in the *Environmental Education and Awareness Assessment* (Fannucchi et al. 1998).
- Forest resources would be managed with the objective of developing a stand of large pines and maintaining regeneration of a pine community through a variety of management activities.
- Diseased and defective trees would be removed annually.

Area 7 Administrative - Cultural Resource Management:

- Preserve, protect and interpret the site of the former CCC camp and develop a non-personal interpretive facility to explain that camp's role in the history of BRSF. Opportunities for this type of user education were identified in the *Environmental Education and Awareness Assessment.* (Fannucchi et al. 1998)

Area 8

Troy Pit Pines
Forest Production Area



This management area occurs within the larger Bayfield Sand Plain ecological landscape. This area, including both private and state owned lands within the project boundary, is approximately 6,500 acres in size with over 90% in state ownership. The Troy Pit Pines area is characterized by very sandy soils, a very rolling topography with a mixed forest cover dominated by red and jack pine with aspen and scrub oak dominant in some areas. Historically, this area had scattered farms that were planted with red pine or jack pine during the CCC era in the 1930s and 1940s. Numerous moderately developed town roads cross this management area. Please refer to the Brule River State Forest State Natural Area map located in the Map section at the back of this document for more information.

The area is within the Bayfield Sand Barrens ecological area which naturally supports a variety of disturbance dominated natural communities and has good site potential for growth of pine species (Eckstein et al. 2001). The *Community Restoration and Old Growth Assessment* identifies maintenance of the jack pine forest through active management as an important opportunity on the BRSF (Eckstein et al. 2001). Maintenance of aspen/birch and oak areas is important to wildlife species and hunting recreation on the BRSF (Watkins et al. 2001). Within this forest production area, there are three sites that were identified for significant natural features; specifically Rush Lake, Kurt's Deep Depression, and Devils Hole Pines (Epstein et al. 1999). Specific management actions for these areas are noted within the management prescriptions. Management directly surrounding these would be adapted to compliment the management prescriptions for these areas. Other than the Rush Lake site, no rare species were noted in this area (Epstein et al. 1999).

The management unit currently provides dispersed recreational opportunities with the potential to offer additional facilities. The existing snowmobile and winter ATV trail that crosses the Brule River State Forest provides a link to a regional trail network. (Watkins et al. 2001). The North Country Trail crosses the BRSF providing an important link for this regional hiking trail. Several lightly traveled forest roads in this area are important in providing access for hunters and other non-motorized recreators as well as fire breaks for forest fire suppression efforts. Interest in additional cross-country ski areas is evidenced by use levels as the Afterhours Ski area, staff observations and the recreation supply and demand assessment.

Area 8 – Troy Pit Pines – Long-term Management Objectives (100 years):

- Maintaining a dry pine forest community for the compatible values of ecological characteristics and a steady supply of renewable forest products. This would include maintenance of primarily pine covertypes, with scattered patches of mixed hardwoods.
- Maintain 22 acre Rush Lake's water quality, diverse beach community, aquatic resources and scenic setting.
- Maintain the 33 acre Kurt's Deep Depression aquatic community and dry slope vegetation.
- Promote a late successional stage forest in the Devils Hole Pines area, dominated by older red pine. Protect the natural stand of red pine and enhance the site by promoting the regeneration of native pine.
- Provide recreational opportunities, which are compatible with the physical characteristics and other uses in the area, including hunting and cross-country skiing.

Area 8 – Troy Pit Pines – Short-term Management Objectives (50 years):

- Increase covertype of jack pine from 1,500 acres to 2,000 acres
- Decrease covertype of red pine from 1,800 acres to 1,700 acres
- Decrease covertype of scrub oak from 1,100 acres to 700 acres
- Maintain about 1,000 acres of aspen and 180 acres of white birch.
- Maintain a component of white pine in various covertypes.
- Maintain 200-300 acres of barren type areas of open grass and upland shrubs in shifting mosaic within the management area.
- Manage the 52 acres forest of the Devils Hole Pines to favor old growth red pines and sustained pine regeneration.

Area 8 – Troy Pit Pines – Authorized Management Activities:

Activities may include clearcuts, shelterwood, group selection and selection harvests, plantation thinning, mechanical and hand planting, mechanical and chemical shrub control, mechanical ground disturbance, road and fire break maintenance, mowing and mechanical brush control, and prescribed fire. Development and maintenance of a new ski trail system, toilet and warming facilities and a parking area would require some land clearing and construction.

Area 8 – Troy Pit Pines – Resource Management Prescriptions:

As appropriate for the specific site, existing ecological communities, wildlife species and timber stand conditions, the following management prescriptions will be used to achieve the long-term and short-term objectives identified above.

- Encourage a mixture of white pine in all natural stands of trees. This is a species that was historically found scattered across the landscape.
- Attempt to eliminate exotic species such as scotch pine through primarily hand cutting treatments.
- Monitor for presence of invasive plants such as leafy spurge and spotted knapweed, particularly in areas where ground disturbance is used for regeneration of tree species

Red Pine

- Manage existing red pine plantations using timber management guidelines found in the DNR Silvicultural Handbook. Young stands would be released from competing vegetation using a variety of methods, including both mechanical and chemical means. Stands would be thinned by entire rows or by more selective methods depending on stand conditions. As stands are thinned, pockets of natural regeneration would be encouraged to grow by removal of overstory where appropriate.
- Red pine natural regeneration techniques would be used whenever feasible, but if not successful, the stand would be mechanically prepared for planting, through either trench, furrow, or spot scarification treatments. The stand would then be replanted either by hand or by machine.
- Regenerate red pine at recommended rotation ages (generally between 90-120 years of age) based upon site quality.

Jack Pine

- Manage jack pine on a 50-year rotation with natural regeneration techniques being used as the first choice for regeneration. Jack pine will be managed for multiple age classes to reduce the potential impact of jack pine budworm. The primary technique used to regenerate jack pine would be to harvest all jack pine and other species within a stand followed by anchor chaining to expose mineral soil and distribute existing seeds across the treated area. Prescribed fire may also be used where feasible. Success of these techniques would be evaluated through a regeneration survey five growing seasons after the chaining occurs to determine if jack pine regeneration was successful. If the natural regeneration is not successful, the area would then be planted.

Aspen

- Maintain current levels of aspen in its present locations for timber production purposes as well as to provide habitat for a variety of wildlife. Differing age classes would be maintained in areas where aspen is most prevalent for optimum wildlife habitat. The aspen would be managed on a 50-year rotation, at which time the stand would require a regeneration harvest. Diversity would be encouraged in the aspen covertype by not requiring all competing species to be cut within regeneration cuts. Very poor aspen sites would be converted to pine through planting of pine species suitable to the site along with site preparation treatments (either mechanical or chemical) to ensure the success of the planting.

Oak

- Maintain scrub oak on poor quality pine sites but convert to jack pine where possible. Stands that are to be maintained as scrub oak would be harvested on a 70-year rotation to maintain a mixture of age classes of this species. The cut areas would be fairly small in size, usually less than 20 acres. Much of the acreage now typed as scrub oak is actually

this mixture of oak, aspen, red maple, and other species. These types would be maintained using patch clearcuts.

White birch

- Attempt to maintain white birch in this ecosystem on current sites that have a predominance of birch.. Birch requires mineral soil exposure and full sunlight to regenerate. Generally, the most birch regeneration on the forest is found in the most disturbed areas such as the sides of old skid roads where mineral soil was exposed. This would be done through a combination of timber harvests and soil scarification techniques such as anchor chaining before or following timber harvests. Prescribed fire would be used where feasible.

Kurt's Deep Depression

This 33 acres site was noted for the aquatic community found in the pond and wetland in the bottom of this glacial kettle as well as the upland barrens vegetation found on the steep slopes descending to the pond. It will be managed passively to maintain these characteristics.

Devils Hole Pines

- Maintain the natural stand of red pine.
- Promote the regeneration of native pine through soil scarification in small areas with anchor chains.
- Some areas surrounding the stand of older pine would be encouraged to develop old growth characteristics through the removal of non-pine species through commercial thinning operations.

Rush Lake

This site has been recognized for a unique geological setting and important aquatic resources by the State Natural Areas program. The 25 acres lake and surrounding shoreline to the ordinary high water mark will be managed as a State Natural Area. The location, objectives and management are detailed in the Brule River State Forest State Natural Areas in the back of this document. The surrounding forest will be managed to replicate natural disturbance in keeping with the objectives of the State Natural Area.

Area 8 – Troy Pit Pines – Recreation Management Prescriptions:

- Maintain the existing snowmobile and winter ATV trail that passes through the area as open for winter use only. It would be closed to motorized traffic the rest of the year.
- Maintain the existing North Country National Scenic Trail that passes through this area as a lightly developed trail with the existing parking lot and access.
- Develop a cross-country skiing trail system. The Devils Hole Trail System would be a 20-25 mile network of trails specifically laid out for the purpose of cross-country skiing. These trails would be unsurfaced and mowed.
- Develop a parking lot for the Devils Hole Trail System with the capacity for 100 cars with a natural surface of grass or other suitable natural material. No specific accommodations or

operations will be made to support mountain bikes, a rustic warming shelter with flush toilets, and a separate and concealed maintenance facility. These developments would accommodate the increase in demand for new trails while protecting the natural qualities of the Brule River State Forest. This facility would be developed on Samples Road about 1 ½ miles from the intersection of Troy Pit Road and HWY 27. This area provides adequate area to construct parking lots, buildings, and trails on flatter lands adjacent to the rolling topography sought out for skiing. It also utilizes existing roads to get to the site.

- The current network of forest roads would be utilized during management activities, and individual roads would be closed to public access based upon the potential for resource degradation. Any new forest roads and drivable skid trails built during forest management activities would be closed following the completion of the timber sale activities. Timber sales that have potential for firewood harvesting would have new roads and skid trails left open for the 2 years following sale close-out.

Rush Lake

- Maintain the existing walk-in access for boating as well as 2 small parking areas.
- This area is currently being used as an undesignated picnic area and improvements such as a campfire ring and a picnic table may be developed to protect the site from further disturbance.

Kurt's Deep Depression:

- No recreational development is proposed.

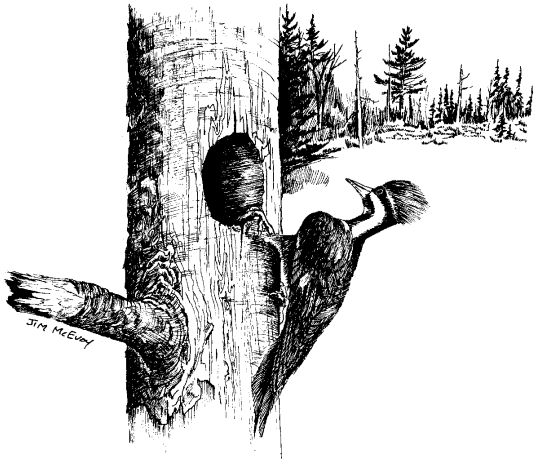
Devils Hole Pines:

- The cross-country ski trail would be near this site. However, the trail would be designed to avoid this site.
- These trails would be unsurfaced and mowed. They will be 20 feet wide with a 16-foot ski grooming width. Existing roads will be used for part of the trail route.

Area 9

Hazel Prairie Pines
Forest Production Area

This area, including both private and state owned lands within the project boundary, is approximately 4,000 acres in size. Very few town roads are located within this management unit, with Hazel Prairie road being the most heavily traveled. Ownership within this management area is primarily state owned, with only a few private parcels.



Hazel Prairie Pines area is a flat, outwash sand plain with very sandy soils. This unit includes the 400 acres terrace area near the Brule River. No significant rare species were noted on these terraces, however, the potential for these sites to produce an older forest of red and white pine was recognized prior to the hail storm impacts (Epstein et al. 1999, Eckstein 2001). Much of this land area was once farmed, and is now primarily vegetated with pine plantations. There is an area of over 2,000 acres of contiguous red pine plantations within this unit. As part of the Bayfield Sand Plains, Area 9 naturally supports a variety of disturbance dominated natural communities and has good site potential for growth of pine species (Eckstein et al. 2001). This unit is on the edge of the sand plains and isolated by the Brule River. In this setting, a lower dominance of jack pine and a higher percentage of red pine, white pine and hardwoods was the historic difference of this area from the areas across the river.

Portions of this forest were heavily damaged by a hailstorm in August 2000, resulting in the death of thousands of acres of trees, primarily jack pine, red pine and aspen. This has created a number of forest management challenges including fire control, disease concerns and future regeneration plans. Approximately 40% of the impacted forest has been harvested of dead and diseased trees and is being regenerated using fire, mechanical scarification or planting. These efforts will provide good information on the benefits of various forest restoration strategies. Planting efforts will focus on a mix of jack pine, red pine and white pine. The remaining 60% will not be treated but monitored for disease and forest growth.

The primary recreation in this area is hunting. Maintenance of aspen/birch and oak areas is important to wildlife species and hunting recreation on the BRSF (Watkins et al. 2001). In this region of Wisconsin the generation of forest products and forest based recreation have been shown to be compatible and often complimentary (Marcouiller and Mace 1999, WDNR 1999). Forest roads in this area provide access for hunting and management as well as serve as fire breaks.

<u>Area 9 - Hazel Prairie Pines – Long-term Management Objectives (100 years):</u>

- Maintain a dry pine forest community for the compatible values of wildlife habitat, ecological characteristics and a steady supply of renewable forest products. This would include maintenance of primarily pine covertypes in different age classes.

- Maintain areas of a mixed hardwood forest with areas of oak and aspen for wildlife habitat and a steady supply of renewable forest products.
- Manage the terrace area toward an older forest of red and white pine.

Area 9 - Hazel Prairie Pines – Short-term Management Objectives (50 years):

- Increase covertype of jack pine from 400 acres to 500 acres
- Increase covertype of white pine from 15 acres to 100 acres
- Decrease covertype of aspen from 1,000 acres to 800 acres
- Maintain about 150 acres of oak.
- Maintain about 1,600 acres of red pine, 60 acres of northern hardwoods and 130 acres of white birch.
- Reestablish a diverse pine forest on the terrace area.
- Maintain a shifting mosaic of about 200 acres of grass and upland brush.

Area 9 - Hazel Prairie Pines – Authorized Management Activities:

Activities may include: clearcuts, shelterwood, group selection and selection harvests, plantation thinning, mechanical and hand planting, mechanical and chemical shrub control, mechanical ground disturbance, road and fire break maintenance, mowing and mechanical brush control and prescribed fire.

Area 9 - Hazel Prairie Pines – Resource Management Prescriptions:

As appropriate for the specific site, existing ecological communities, wildlife species and timber stand conditions, the following management prescriptions would be used to achieve the long-term and short-term objectives identified above.

Pine-dominated sites

- Manage existing red pine plantations using timber management guidelines found in the DNR Silvicultural Handbook and described under the Troy Pit Pines management area.
- Following harvest, prepare sites for tree planting using mechanical planting site preparation methods such as furrowing, disk trenching, or spot scarification.
- Use natural and artificial regeneration techniques to encourage a native mix of jack pine, red pine, white pine, and various hardwoods on the landscape. Following the significant tree mortality caused by the August 2000 hailstorm, a variety of adaptive techniques will be used to quickly reproduce a forested landscape. These may include prescribed fire, roller chopping, scarification, and planting among other options.
- Plant red pine with a mixture of white pine and jack pine in some locations.
- Plant existing openings that are not within frost pockets with red pine, provided they are not suitable for future log landings.
- Maintain jack pine on sites that it currently occupies as well as in frost pockets. It would be managed on a 50-year rotation with natural regeneration techniques being used as the first choice for regeneration.
- Existing pine plantations on the terrace area would be thinned to produce a more natural looking old pine forest.

Aspen

- Manage aspen on a 50-year rotation, at which time the stand would require a regeneration harvest. Diversity would be encouraged in the aspen covertype by not requiring all competing species to be cut within all regeneration cuts.

Area 9 - Hazel Prairie Pines – Recreation Management Prescriptions:

The current network of forest roads would be utilized during management activities and individual roads would be closed following timber sales based upon the potential for resource degradation. Any new forest roads and drivable skid trails built during forest management activities would be closed following the completion of the timber sale activities. Timber sales that have potential for firewood harvesting would have new roads and skid trails left open for the two years following sale closeout. Fire suppression equipment and personnel would utilize these lightly traveled roads for access and as fire breaks if necessary. Closed roads would remain open to hunters and other non-motorized recreators for walking only.

Area 10

Pine Forest and Barrens
Native Community Management Area

This site occurs within the larger Bayfield Sand Plain ecological landscape. This area, including both private and state owned lands within the current project boundary, is approximately 6,800 acres in size but only about 3,900 acre is state owned. The management area contains the almost 600 acres Mott's Ravine State Natural Area. Please refer to the Brule River State Forest State Natural Area map located in the Map Section at the back of this document for more information. It extends from the southern edge of the Brule Bog management area south to the current forest boundary.

This management area can provide management of some barrens and dry pine forest community elements at the scale of 100s of acres. However, to manage for the complex plant communities and seral stages present in a barrens/dry pine forest ecological landscape management must occur at a scale in the 1,000s to 10,000s of acres. Including the management of the southern expansion area would allow this level of ecosystem management. If these lands were acquired, the management would be guided by the condition of the land and the general intent and prescriptions outline for Management Area 10 listed below.

The vegetation of Management Area 10 is a mixture of red and jack pine plantations, scrub oak, and aspen forest types. Other existing native communities include open, grassy-brush prairie (a.k.a. barrens), pine savannas (pine barrens), dense regenerating pine forest, and mature pine forests. Prior to the extensive salvage of jack pine in the early to mid 1990s due to an outbreak of jack pine budworm, the forest cover was dominated by jack pine with red pine being the second most dominant forest type. Other less common forest types found here were white pine, oak, aspen, and mixed hardwoods.

Within the current state forest project boundaries the *Biotic Inventory of the Brule River State Forest* identifies a site referred to as the "North Country Trail Barrens" (Epstein et al. 1999). Approximately half of this 2,800-acre site is in private ownership. It is recommended that consideration be given to maintaining the existing natural community remnants and expanding them where feasible. Native communities found here prior to 1850 ranged from open, grassy-brush prairie (a.k.a. barrens) to pine savannas, dense regenerating pine forest, and mature pine forests. The forest cover was dominated by jack pine with red pine being the second most dominant forest type. Other less common forest types found here were white pine, oak, aspen, and mixed hardwoods. The *Community Restoration and Old Growth Assessment* recognized the unique but small opportunity to restore 400-600 acres of barrens on the existing state forest land in the Motts Ravine area and also recommends the maintenance of the existing jack pine

component (Eckstein et al. 2001). Within the region there are other public lands with greater acreage and potential for barrens restoration than the BRSF (Bartelt et al. 1999).

The full ecological value of a barrens/dry pine forest landscape cannot be realized with the limited acreage in this management area (Bartelt et al. 1999, Epstein et al. 1999). If lands were purchased in the southern boundary expansion they would add to the landscape ability to replicate these ecological communities. Depending on the condition when acquired, lands in the expansion area would be managed with a similar combination of barrens and dry pine forest community goals.

An existing snowmobile and winter ATV trail passes through this management area parallel to and south of the Brule River. Also, the southern portion of the Historic Portage Trail runs parallel to and south of the East Fork of the Brule River in this area.

Area 10 - Pine Forest and Barrens – Long-term Management Objectives (100 years):

- Through management of existing state ownership and additional lands create a pine barrens landscape with permanent open areas and a shifting mosaic of the full compliment of barrens plant communities and seral stages at a scale of 1,000s and 10,000s of acres. This diverse ecosystem would be large and dynamic enough to more closely replicate historic disturbance patterns and support sustainable populations of characteristic wildlife such as sharp-tailed grouse.
- Restore and maintain a mosaic of native vegetative communities that provide a range of conditions from open barrens to dry pine forest types.
- Mimic natural disturbance patterns in rates and size, as best as knowledge and implementation constraints allow.
- Maintain jack pine as the dominant tree species with red pine being secondary.
- Maintain white pine, oak, aspen, and hardwoods in significantly smaller amounts.
- Maintain existing recreation of primarily snowmobile trails, hiking trails, wildlife viewing, berry picking and hunting.
- Protect the water quality and quantity of an important groundwater recharge area and tributaries of the Bois Brule River.

Area 10 - Pine Forest and Barrens – Short-term Management Objectives (50 years):

- Gradually thin existing red pine plantations to natural dry forest, pine savanna or barrens conditions. The current 1,500 acres of red pine covertype would be reduced to 1,000 acres
- Increase the grass and shrub covertype from 180 acres to the 600 acres goal for barrens.
- Increase the 1,300 acres of jack pine to 1,700 acres
- Decrease the oak cover from 750 acres to 500 acres
- Decrease the aspen cover from 150 acres to 100 acres
- Conduct monitoring of vegetation every ten years to measure the effects of management and aid in developing adaptive management approaches.
- Maintain existing levels of roads and trails for recreation. Add a loop overlook trail segment for the snowmobile trail.

Area 10 - Pine Forest and Barrens – Authorized Management Activities:
Activities may include, clearcuts, shelterwood, group selection and selection harvests, plantation thinning, mechanical and hand planting, mechanical and chemical shrub control, mechanical ground disturbance, road and fire break maintenance, mowing and mechanical brush control, and prescribed fire.

Area 10 - Pine Forest and Barrens – Resource Management Prescriptions:
As appropriate for the specific site, existing ecological communities and timber stand conditions, the following management prescriptions will be used to achieve the long-term and short-term objectives identified above:

- Conduct forest reconnaissance monitoring of vegetation every ten years and develop additional vegetation monitoring as needed to evaluate management results.
- Use a combination of timber harvest, prescribed fire, mechanical scarification/site preparation, and seeding or planting to mimic natural disturbances.
- Avoid impacts to the vegetation on the slopes of Jerseth Creek to maintain this important trout spawning area.
- Additional information on the Mott's Ravine State Natural Area (655 acres) is provided in the Appendix – Brule River State Forest State Natural Areas write up and map.

Barrens

- Restore open barrens and pine savannas areas, in the Motts Ravine State Natural Area, through clearcutting, thinning and prescribed burns to recreate a representative natural vegetative community, that includes jack pine and scrub oak as scattered individual trees and small groves.
- Additional information on the Mott's Ravine State Natural Area can be found in the Brule River State Forest State Natural Area section in the Appendix.
- A central core area of grass and shrub habitat of 200-400 acres would be permanently maintained through prescribe fire or mechanical vegetation management as needed.
- Lands surrounding this central core, within and outside the State Natural Area, would use timber harvest to provide a shifting mosaic of early age forest, grass and shrub habitats to increase the effective size of the early successional habitat in the core area.

Pine-dominated Sites

- The pine forest would be managed to maintain a dominance of jack pine, with red pine, aspen and oak as lesser components. Management would consist of regeneration harvests at or before biological rotation age (45-70 years old) followed by treatments (anchor chaining or prescribed fire) to stimulate natural regeneration. In some cases direct seeding or planting may occur to bolster regeneration numbers and/or alter species composition. Fully stocked stands of pine would be the goal within these areas.
- Final harvest of a timber stand would range from 50 to 100% of the mature trees on an area ranging in size up to several hundred acres.
- Prolong regeneration attempts 3-5 years to mimic the natural period of open grassland/savanna habitat following fire. Less than optimal (full stocking rates) would be accepted in some areas in order to provide savanna conditions.

- Use natural regeneration where possible. Consider planting of trees and other native vegetation when needed to restore the full community.
- Site preparation for planting may include techniques such as furrowing, prescribed burning, anchor chain scarification, brack scarification, pre-sale scarification with bulldozers, and even fully plowing and disking specific sites.
- Use herbicide only as needed to control invasive exotic species or to create a specific effect on the vegetative structure and composition needed to fulfill a complete community restoration objective.

Area 10 - Pine Forest and Barrens – Recreation Management Prescriptions:

- Maintain the existing snowmobile and winter ATV trail that passes through the area, open from December 1 to March 30 annually. The trail would be closed to motorized traffic the rest of the year.
- Re-route the trail, if possible, to improve the safety of the trail and re-route it from a steep area on private land.
- A loop trail and scenic overlook is to be added to the segment to the existing snowmobile trail and winter ATV trail that parallels the Bois Brule River. The loop would be approximately 200 yards long and would lead riders to a scenic overlook of the Brule Bog located on the terrace adjacent to Jerseth Creek. The trail would be designed as a one-way, low volume snowmobile trail; five feet wide with a two foot wide cleared strip on either side. The surfacing would be stable aggregate with the trail bed smoothly graded and well compacted. The overlook would be approximately a 12 foot diameter aggregate surfaced are with a kiosk that interprets to ecological features of the Brule Bog. The trail would be aligned to avoid larger, older trees to conform to the existing grade wherever possible.
- Maintain the current level of forest roads open to vehicular traffic. These roads provide a valuable function as fire breaks and public access. Some roads may be closed following management actions while others are being opened.
- Maintain the existing North Country National Scenic Trail that passes through this area as a lightly developed trail.

Area 11

Gordon Annex
Forest Production

The Gordon Annex Forest Production Area is located about 10 miles south of the main portion of the state forest. This 1,000-acres area was once used as a state forest tree nursery, closing nursery operations in the mid 1960s. Now located on the property is a minimum-security prison, which is operated there by agreements between the Department of Corrections and the DNR.

This land area is located within the Bayfield Sand Plain and has very sandy soil conditions. The Eau Claire River flows through the Gordon Annex. A small, unnamed lake is located partially within the property in the northeast corner of state ownership. Surrounding ownership is primarily industrial forestland, with only a few bordering private non-industrial owners.

Vegetation types on this management unit primarily consist of pine plantations. Much of this area was planted with leftover trees from nursery operations. There are small areas of aspen and one undisturbed kettle bog is located in the center of the property. A rare plant was found in a barrens remnant within a pine plantation adjacent to the bog and rare invertebrates occur in the Eau Claire River (Epstein et al. 1999).

Area 11 – Gordon Annex - Long and Short-term Management Objectives:

- Provide a steady supply of renewable forest products with emphasis on growing red pine.
- Maintain 400 acres of red pine, 250 acres of jack pine and 80 acres of aspen.
- Provide for a mix of tree species in aesthetic areas along the river and public roads.
- Maintain the long term lease of 45 acres with Department of Corrections for use as a minimum security prison
- Maintain the bog in a natural state to continue to provide habitat for a rich native flora of highly specialized species.

Area 11 – Gordon Annex - Authorized Management Activities:

Activities may include, clearcuts, shelterwood, group selection and selection harvests, plantation thinning, mechanical and hand planting, mechanical and chemical shrub control, mechanical ground disturbance, road and fire break maintenance, mowing and mechanical brush control, and prescribed fire.

Area 11 – Gordon Annex – Resource Management Prescriptions:

As appropriate for the specific site, existing ecological communities, wildlife species and timber stand conditions, the following management prescriptions would be used to achieve the long-term and short-term objectives identified above.

- Maintain existing forest openings and woods roads throughout this area to provide firebreaks in case of a wildfire.
- This area would also remain available for fire training operations. Historically, this area had been used as a location for fire equipment training and certification.
- Maintain other species such as scrub oak, birch, and red maple as components of jack pine and aspen stands.
- Manage the riparian areas of the Eau Claire River to encourage species such as scrub oak, red maple, and aspen mixtures.
- Eliminate scotch pine from the landscape primarily through hand-cutting.

Red pine

- Manage existing red pine plantations using timber management guidelines found in the DNR Silvicultural Handbook. Practices used would vary by stand condition but would follow a similar prescription to that described in the Troy Pit Pines Management Area.
- Plant red pine with a small amount of white pine mixed into the first 20 rows adjacent to town roads. Prior to planting, the site would be prepared through a mechanical scarification treatment.

Jack Pine

- Maintain jack pine as a small component of future stands as natural regeneration.
- Maintain the jack pine that presently borders the river.
- Manage jack pine on a 50-year rotation with natural regeneration techniques being used as the first choice for regeneration.
- The primary technique used to regenerate jack pine would be to harvest all jack pine and other species within a stand followed by anchor chaining to expose mineral soil and distribute existing seeds across the treated area. If jack pine regeneration is poor, replanting would be done. In some cases this would mean the entire area would be replanted, in others it would mean that spot planting would be done to bolster stocking rates.

Aspen

- Maintain current levels of aspen in its present locations for timber production purposes as well as to provide habitat for a variety of wildlife.
- Manage aspen on a 50-year rotation, at which time the stand would require a regeneration harvest.

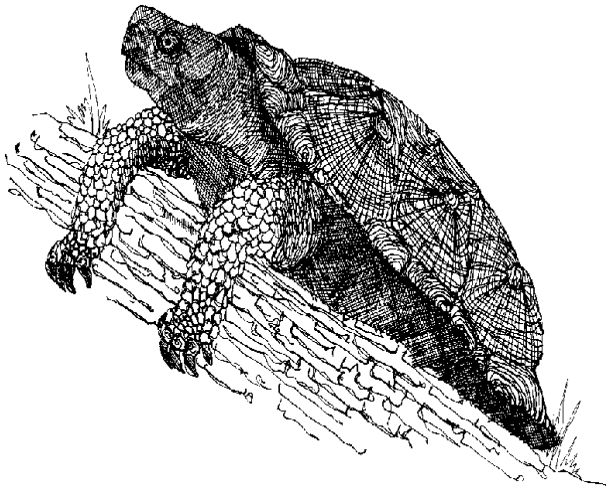
Area 11 – Gordon Annex - Recreation Management Prescriptions:

- Due to the location of the prison, much of this area is off limits to public use. The only developed recreation area on the property is a rustic boat landing on the Eau Claire River located off of Highway G. Other recreational activities involve hunting outside of the posted area surrounding the prison.
- The current network of forest roads would be utilized during management activities, and individual roads would be closed to public use following timber sales based upon the potential for resource degradation. Any new forest roads and drivable skid trails built during forest management activities would be closed following the completion of the timber sale activities.

THE MILLE LACS UPLANDS - ECOLOGICAL LANDSCAPE

Subsection 212Kb (National Hierarchical Framework of Ecological Units)

The Mille Lacs Uplands occurs on the western fringe of the Brule River State Forest. Included within this ecological landscape is the area known as Lake Minnesuing. This landscape is characterized by rolling topography and sandy soils. Historically, this area was dominated by white pine and yellow birch with a mix of aspen, white birch, sugar maple, white spruce, and balsam fir as common associates before European settlement (Eckstein et al. 2001). Today, this area has a second growth forest of aspen, sugar maple, basswood, and red oak. A number of significant wetlands that support rare species occur within the broad ecological landscape (Bartelt et al. 1999, Epstein et al. 1999).



Area 12

Willard Road
Native Community Management Area

The Willard Road / Blueberry Creek management area occurs along a transition between the Bayfield Sand Plain and Mille Lacs Upland ecological landscapes. This area, including both private and state owned lands within the project boundary, is approximately 3,400 acres in size with 2,700 acres in state ownership. It occurs primarily on the western edge of the Brule River State Forest in the area north and west of the Brule River between CTH B and CTH S.

The Mille Lacs Upland has a richer and moister soil than most uplands within the BRSF and studies suggest that it has the potential to support a northern hardwood forest (Eckstein 2001). This management area represents a gradual transition into the drier soils of the disturbance dominated forests on the Bayfield Sand Plain. Historically this area likely experienced periodic windthrows and fires but at a lower frequency than the area east of the Brule River. Very large forest fires altered this area's forest cover in the 1920s, causing large areas dominated by aspen. Much of the oak got its start following these fires but white pine did not fair well. The BRSF *Community Restoration and Old Growth Assessment* rated the northern hardwood restoration opportunity as low on the BRSF (Eckstein et al. 2001). The *Regional Ecology Assessment* notes that other public lands have greater opportunity to support the northern hardwood community type in this area (Bartelt et al. 1999). This area contains varied topography, with small kettle swamps filled with black spruce surrounded by upland oak and aspen. There are two Biotic Inventory sites that contain remnants of native red pine stands.

Area 12 – Willard Road - Long-term Management Objectives (100 years):

- Restore and perpetuate the native mixed hardwood forest ecosystem including aspen, white birch, yellow birch, red maple, sugar maple, red pine, white pine and red oak.
- Promote a diverse mixture of size and age classes while slowly increasing the percentage of northern hardwood covertype in the area.
- Establish 2 forest management reference areas within this management area located at the Vapa Road Pines and Willard Road Pines sites (Epstein et al. 1999). These sites would be passively managed as large red/white pine reference sites.

Area 12 – Willard Road - Short-term Management Objectives (50 years):

- Reduce the dominance of aspen from 1,600 acres to 1,000 acres allowing the other hardwoods present to increase to 600 acres of northern hardwood.
- Maintain 380 acres of white birch.
- Maintain a pine component with 250 acres of red pine, 60 acres of jack pine and 20 acres of white pine.
- Maintain 150 acres of oak.

Area 12 – Willard Road - Authorized Management Activities:

Activities may include passive management, clearcuts, shelterwood, group selection and selection harvests, mechanical ground disturbance, mechanical or hand planting, mowing, prescribed fire and mechanical brush control.

Area 12 – Willard Road – Resource Management Prescriptions:

As appropriate for the specific site, existing ecological communities and timber stand conditions, the following management prescriptions will be used to achieve the long-term and short term objectives identified above:

- Regenerate the mixture of hardwoods and pine that are native to this ecoregion by clearcutting small, irregularly shaped areas less than 15 acres in size and leaving seed source trees along the edges of the cut areas.

- Hand-plant pine within and along the edges of the small cut areas and protect young trees from animal browsing.
- Use management actions such as selection, shelterwood and seed tree harvests in conjunction with scarification to promote pine, oak, and birch regeneration.
- Use scarification around existing large pine to promote establishment of pine seedlings into the ecosystem.
- Perform site scarification for white birch. This species is declining in numbers across this ecoregion and requires an adequate seedbed for its regeneration. Small-scale attempts (less than 15 acres in size) would specifically be made to regenerate this species using intensive site scarification in conjunction with shelterwood and seed tree cuts. Direct seeding efforts may be tried following the scarification to bolster natural seeding.
- Passively manage the two reference areas but monitor vegetation change to provide information on future management elsewhere.

<u>Area 12 – Willard Road – Recreation Management Prescriptions:</u>

- Most of the primitive roads in this management unit are hunter-walking trails such as those along Anderson Road and Hilltop Road. Other roads that are currently open to vehicle traffic would remain open for this use unless resource degradation is occurring as a result of the vehicular traffic.
- Close newly constructed primitive roads that are built for management purposes immediately following the management activity unless there is good potential for firewood gathering. If left open for firewood gathering, the roads would be open for 2 years following the management activity, and then bermed or gated to block vehicles.
- Retain forest roads that are open for traffic, as they serve as firebreaks and provide access for fire suppression equipment.

Area 13

Lake Minnesuing
Scenic Management Area

This management unit is located on the western end of the BRSF and extends along the western and southern shores of Lake Minnesuing down south to Hazel Prairie road. This area, including both private and state owned lands, is approximately 1,000 acres in size with 730 acres in state ownership.

Several town roads are within this area as well as HWY P and HWY L. The state forest maintains a primitive boat launch at the end of Park Road. This area is lightly used as a boat launch, but is heavily used at times during winter months to access the lake for ice fishing.

Area 13 – Lake Minnesuing - Long-term Management Objectives (100 years):

- Maintain an older forest of primarily shade tolerant species such as northern hardwoods and hemlock for the scenic values of that setting.
- Monitor hemlock and white pine regeneration to determine if small scale management actions are necessary to keep these species as a component of the forest.

Area 13 – Lake Minnesuing - Short-term Management Objectives (50 years):

- Thin an existing pine plantation to a naturally appearing density.
- Monitor hemlock and white pine regeneration and recommend management actions; openings, planting etc. to provide a future generation of these species.
- Allow natural succession to reduce areas of aspen and white birch in favor of shade tolerant northern hardwoods. This will take 80-100 years to see a major shift in species.

Area 13 – Lake Minnesuing - Recreational Use Setting Subclassification:
The Lake Minnesuing / CTH P - Scenic Management Area would be managed as a Type 3 recreational use setting. The objective for a Type 3 setting is "to provide readily accessible areas with modest recreational facilities offering opportunities at different times and places for a variety of dispersed recreational uses and experiences" (NR 44.07).

Area 13 – Lake Minnesuing - Authorized Management Actions:
Thin existing pine plantations, research hemlock regeneration, monitoring and control of exotic plants. Encourage regeneration efforts through planting.

Area 13 – Lake Minnesuing – Resource Management Prescriptions:
As appropriate for the specific site, existing ecological communities, and scenic resources, the following management prescriptions will be used to achieve the long-term and short term objectives identified above.

- Timber harvesting would be limited to thinning an existing pine plantation and potential research into hemlock regeneration.
- In the case of a catastrophic event such as a windstorm, a fire, or flood, timber salvage operations would be conducted to clean up the areas affected by the event and restore scenic beauty.
- There is one small pine plantation to the east of CTH P that would be thinned to create a naturally appearing forest. This pine plantation is not readily visible from CTH P since it is located up a hill from an inside corner of the highway.
- Research in the Lake Minnesuing area would be focused upon obtaining hemlock and possibly white pine regeneration. This may include cutting openings to create conditions for regeneration or planting.

Area 13 – Lake Minnesuing - Recreation Management Prescriptions:
- Maintain the existing boat landing at Lake Minnesuing as a Type 3 recreational use setting with a small mowed area.
- The existing forest roads in the Lake Minnesuing area would be closed to motorized travel. These trails would be designated as a Type 3 recreational use setting with restrictions, and be maintained as lightly developed trails through periodic mowing. A primitive nature trail would be maintained leading to a picnic spot next to the lake. These developments would accommodate hikers and picnickers while preserving the rustic character of the area.

CHAPTER THREE

ENVIRONMENTAL IMPACTS OF THE MASTER PLAN

OVERVIEW

Chapters Two, Three, Four and Five in combination, function as the environmental impact statement (EIS) for the Brule River State Forest (BRSF) Master Plan revision. An EIS is an "environmental analysis that is prepared to inform decision-makers and the public of a proposed action's effect on the environment. It "enables environmental and economic factors to be considered in the development of a proposed action" (Wisc. Admin. Code - NR 150.22 (1) (b)). This chapter evaluates the environmental impacts of the management actions of the Master Plan, described in Chapter Two. This evaluation of environmental impacts compares any proposed changes in the management of the property to its current management, generally defined by the 1979 Master Plan and current state forest policy.

This document is intended to be an exploration and objective evaluation of the environmental impacts resulting from the Master Plan for the Brule River State Forest. It is also a key element in the master plan's decision making process as required under state and federal law. This chapter is organized according to the various resources or parties that may be impacted. Each section will briefly describe the existing conditions on the property, and any proposed changes from the current management, that would result in some sort of environmental impact.

The identification and description of an impact may be either positive or adverse. In the case of an adverse impact, mitigation measures may be proposed. It is important to remember that the disclosure of adverse environmental effects in an EIS does not necessarily require that a proposed action be denied or terminated". A "mitigating measure" is an activity proposed to reduce the severity or extent of adverse environmental impacts that would result from a proposed activity.

The reader who wishes to more fully understand the environmental impacts resulting from the Master Plan, should become familiar with the various physical and ecological characteristics, as well as, the use and history of the property. During the master plan process, it became apparent that current environmental conditions and management practices were not will understood by the public, therefore, considerable effort is made in this chapter to provide the scientific foundation of the current condition in order to understand the impacts of the master plan. Additional information on the physical and ecological characteristics is contained in Chapters Two and Five of this document, as well as the supporting documents. These documents include: the Northern Forest Assessments, the Biotic Inventory and Fact Sheets listed in the Bibliography.

IMPACTS TO PHYSICAL AND BIOLOGICAL RESOURCES

Water Quality, Aquatic Habitat, Soil, Hydrology, Fish and Aquatic Species

The quality of the habitat for aquatic animals in the stream and river habitats is primarily dependent on the quality and quantity of water, which is primarily dependent on the basin hydrology. Therefore, these impacts are discussed in one unit. The proposed management action has the potential for both positive and negative short-term impacts with a long-term net positive impact on the quality and quantity of water within the Brule River Ecosystem. Overall, management of these lands for a diversity of types and ages of forest, shrub, wetland and grass habitats while providing for a low level of recreational facilities is expected to improve or maintain the excellent water quality and aquatic habitat within the Brule River State Forest.

Current Conditions of Water Quality and Aquatic Habitat

Rivers/Streams

The Brule River system is known for its excellent water quality (Koshere 1998). The condition of these water resources has been supported by decades of sound land management within the watershed. Water quality can be represented by chemical, physical or biological parameters. In previous studies of the Brule River, results from all of these parameters described a high quality water system. The Brule has an extensive historical sampling base for water chemistry for a period from 1973 – 1994, when 36 different chemical and physical parameters were measured. These data show very consistent values and indicate good water chemistry (Koshere 1998). For example, dissolved oxygen consistently runs near 100% saturation with the Brule River. Physical parameters indicate a consistent flow and temperatures, which support the quality trout stream classification. Some fluctuations in flow and sediment have been observed on the clay plain because of the low infiltration rates of clay and the natural bank erosion but the measurements have remained within a range of good to excellent water quality.

Biological monitoring is perhaps one of the best overall water quality monitoring methods, as this kind of monitoring integrates stream conditions over the life cycle of fish or invertebrates (DuBois 1993, Koshere 1998). An aquatic organism can survive and be present only if its most critical life cycle conditions are met all of the time. Stream water quality can be measured based on the health of the aquatic insect community. Both aquatic invertebrates and fish monitoring indicate that the Brule River has excellent water quality. A commonly used index tool is the Hilsenhoff Biotic Index (HBI), which assigns a tolerance value, ranging from zero to ten for individual species, with zero as the highest quality value. In a 1983-84 HBI study of the Brule River from 15 areas throughout the river system, all sites fell within the excellent range, indicating no apparent organic pollution (Koshere 1998, Dubois 1993). The study found 21 species of aquatic macroinvertebrates with an HBI tolerance value of zero, indicating exceptional water quality based on the aquatic insect community. Periodic aquatic invertebrate sampling since1984 has indicated consistent high quality of the invertebrate community and water quality. In 2002 the HBI sampling was repeated and the data confirmed that the high water quality in the Brule River system had been maintained over the last 18-20 years (Dubois 2002). For more

information refer to the Appendix. The two HBI sampling areas that had lower "very good" rating rather than the "excellent" rating where located downstream from the Lake Nebagamon and the DNR fish hatchery. However, excellent ratings were restored before these tributaries reached the Brule River. Fish are also a measure of stream quality and, in the case of a healthy Class 1 trout stream, indicate continuous high quality conditions that sustain a healthy and reproducing population of a pollution intolerant fish community. Brook trout are a very good indicator of coldwater ecosystem health and watershed quality. Their reproductive needs are more easily impaired by watershed perturbations than other salmonids. The brook trout population of the Brule River most closely resembles its original condition and is the healthiest of streams in the Wisconsin Lake Superior Drainage.

In addition to the excellent water quality within the Brule River and its tributaries, this system provides excellent physical habitat that is the basis for the excellent fish and aquatic life found here. The system provides important habitat for the trout and salmon fishery as well as habitat for a number of rare aquatic invertebrates. In- stream management practices such as addition of gravel, construction of fish habitat structures and bank stabilization on the Brule River and its tributaries have also contributed to the excellent fish habitat. Many of the rare species located within the BRSF were aquatic or wetland species associated with the Brule River Ecosystem.

Lakes/Wetlands

On the clay plain the natural wetlands are primarily areas that are shrub dominated and associated with drainages or areas of clay with poor drainage. A management strategy that has been important to the hydrology and aquatic habitat within the clay plain has been the construction and maintenance of wetlands within the BRSF. These wetlands provide habitat for a wide variety of wildlife such as sora rails, American bitterns, spotted sandpipers, pied-billed grebes; song birds such as sedge wrens, yellow-headed black birds, belted kingfisher, eastern kingbird; and waterfowl such as mallards, blue-winged teal, hooded merganser, and Canada geese. In addition, they provide additional water storage on the clay plain thus reducing localized runoff to streams.

Several lakes not associated with the Brule River are present within the sand plain of the BRSF. These include Rush, Smith, Gilbert, and Mills lakes which are all small soft water seepage lakes. Hoodoo Lake is within the BRSF project boundary, but is surrounded by private land. Smith and Rush Lake are identified as Aquatic Priority Sites because of presence of rare aquatic invertebrates (Lake Superior Water Quality Management Plan 1999). The BRSF also has shoreline ownership and public access along the north end of Upper St. Croix Lake. Numerous depression wetlands occur throughout this area. Other than the Upper St. Croix Lake these habitats do not provide significant fishery resources. They do however, provide important habitat for other aquatic and wetland animals and plants.

Current Condition of Soil and Hydrology

Clay Soils

Within the current ownership about 27% of BRSF is located on the red clay soils of the Lake Superior Clay Plain. Including both public and privates lands, about 20% of the land within the

Brule River watershed is clay soils. These lands are primarily those north of HWY 2 and support the lower Brule and portions of several streams. The topography in the Clay Plain is characterized by numerous wetlands and drainages forming narrow, steep sided valleys cutting through a gently rolling plain (Bartelt 1999, Koshere 1998). In this area, rain or snowmelt is held on the clay soil surface or runs quickly into streams instead of soaking into the ground. The rapid runoff characteristic of the soils causes regularly occurring peak flows, which accelerate stream bank erosion and result in short term instream turbidity in the lower reaches of the river. Slopes along the Brule River are steep in many places, and erosion of streambanks is common during high water conditions. The streambanks appear to be clay, but actually contain substantial quantities of sand. These steep, sandy banks are the source of much of the sand sediment found in the streambed of the Brule. While not the source of the sedimentation, the clay soils do turn the water reddish brown, and would do so in this watershed regardless of land use (Rissman et al. 2000). However, certain land use practices increase the flow of water and result in greater streambank erosion and sedimentation in the Brule River.

In the watershed of the Bois Brule River, land use practices may either contribute to or minimize the frequent high, fast flows of water in the river that result in erosion of the streambank. These periods of peak flow will have the greatest impact on changes in the stream channel, since the main threat to the Brule is not the sediment carried to it from the uplands but the sheer volume and speed of delivery of water from within the watershed (Rissman et al. 2000). The effects of land cover on streams are most prominent during large rainfalls, floods, and snowmelt (Fitzpatrick et al. 1999, Verry 2001). Generally, less developed and more vegetated land reduces the flow of water to the Brule River. Most of the land within the lower Brule watershed on the clay plain is state owned and managed as the state forest.

Since the early 1960s the Department has been acquiring lands in the clay plain. Other land use and covertypes within the lower watershed include wetlands, hayfields, residential developments, cropland, and roads (See Water Resources Fact Sheet in the Appendix and Chapter Two for more information). Within the clay plain, the greatest potential impacts to water quality come from roads and construction projects conducted primarily by private landowners and local governments (Rissman et al. 2000). Residential areas also contribute to increased runoff and non-point pollution. Agricultural fields allow for more soil loss and water runoff than either hayfields/ grasslands or forests which both have low rates of soil erosion. Forests older than 15 years have very low soil erosion potential, hayfields and grasslands that are not tilled have slightly higher erosion rates and forests less than 15 years old have moderately higher rates of erosion (Rissman et al. 2000, USDA 1988). Overall these forest and grassland communities are several to many times less likely to erode than roads or construction projects on the clay plain. The predominance of undeveloped land in the lower Brule River watershed helps protect water quality.

Sand Soils

Within the current ownership of the BRSF about 73% of the land is located on the sandy or loamy sand soils of the Bayfield Sand Plain and Mille Lacs Ecological Landscapes. Including both public and private land about 80% of the Brule River watershed uplands are dominated by sandy soils. These lands make up the southern part of the BRSF south of HWY 2.

This landscape is characterized by rolling hill topography and widely scattered kettle lakes and wetlands (Bartelt et al 1999). The sand or loamy sand soils permit rapid infiltration of precipitation and ready movement of groundwater that provides the relatively stable base flow of the upper Brule River watershed (Koshere 1998). This ground water flow supplies the cold water springs, which support the aquatic habitats and trout fishery of the Brule River and its tributaries. In contrast to the clay plain soils to the north, rainfall on these sand soils tends to filter in quickly rather than run off as surface water (Rissman et al 2000). The topography directs much of the rainwater to lakes and other depressions where it is filtered before draining into the Brule River. Therefore, erosion and high overland flow are less of a threat in the upper Brule River watershed, though there is potential for localized erosion along roads, trails, and drainage ditches.

The highly permeable sand soils of the sand plain portion of the Brule River watershed and predominant pattern of public land ownership and forest cover greatly limit the potential for nonpoint source pollution. Nonpoint pollution is closely associated with overland runoff (Koshere 1998). However, sandy areas are more susceptible to groundwater contamination than areas with clay soil.

Impacts - Instream Habitat Management

Just as land management practices do, instream management practices can have positive or negative impacts on water quality and aquatic habitats. Instream management practices on the Brule River and its tributaries have been conducted by fisheries managers for decades and have include dredging of silt, addition of gravel, construction of fish habitat structures and bank stabilization (Keniry 2002). In addition, beaver control and dam removals have been conducted to protect and improve habitat for salmonid fish. This master plan will continue various instream fish habitat work to maintain and improve the fish habitat. Overall, this is expected to maintain present levels of fish habitat, combined with regulations, will maintain a high quality fishery.

Fish habitat projects in the management plan may cause some short term negative impacts. The instream habitat projects including, deposition of gravel or construction of fish habitat structure, have the potential for temporary and localized increases in turbidity and negative impacts on water quality. These actions generally result in temporary disturbance of existing sediments and vegetation. The impacts of these projects are mitigated by their small scale and localized nature. The level of management is expected to be similar to previous levels, which occurred while maintaining high water quality and high aquatic habitat levels.

Beaver control measures are specifically designed to reduce beaver populations in specific areas and remove beaver dams. These measures obviously have a negative impact on beavers. In addition, beaver dams create a different type of habitat favored by wetland rather than stream plants and animals. The proposed actions are specifically designed to reduce these wetland habitats in favor of stream habitats.

The instream habitat work is specifically designed to improve aquatic habitat for salmonid spawning, foraging, and resting as well as benefiting aquatic invertebrates and other aquatic animals. Stream bank stabilization efforts will reduce erosion and sedimentation over the long term. While the management actions outlined in this plan will provide positive contributions to the aquatic habitat for the sport fishery, it is recognized that angler over-harvest has long been the major limitation to conservation of good fishing in both the resident and lake run portions of the Brule River fishery (Pratt 2000).

Impacts - Clay Soil Areas

This master plan will maintain several different community types using a variety of land management practices. Overall, the area of constructed wetlands, grasslands, white birch and northern hardwood forests should remain about the same, aspen will show a moderate decline while the conifer component of the forest will increase over a 30-50 year period. The overall age of the forest communities should increase under this management plan.

In order to achieve the forest community goals outlined in Chapter Two, exposure of the clay soils through timber harvest, prescribed fire, planting, and soil disturbance will occur. Overall, the approved management plan would result in 0.5-1% of the clay plain within the BRSF being exposed at any one time. These management actions that expose the clay soils have the potential to temporarily result in increased over land water flow on a localized basis. The magnitude of water movement will depend on the slope of the land and local precipitation patterns where the action is being taken; however, under this plan actions on steep slopes will be avoided. This movement of water has the potential for increasing water volume to nearby streams resulting in increased bank erosion, and temporary impacts to water quality and quantity (Rissman et al. 2000).

Mitigating measures that are regularly used by state forest staff exceed the requirements of Best Management Practices for Water Quality and will minimize the potential for negative impacts (Holaday 1997). These practices are part of regular planning and operations and include: limiting the percent of the lower watershed in management, little to no road building, conducting management well beyond recommended distances from streams, conducting management actions in small (2-10 acres) irregularly sized blocks, conducting timber harvests only on dry or frozen ground and avoiding significant soil disturbance on slopes directly adjacent to streams. In addition, the Brule River scenic corridor will be managed without active management except in cases of public safety.

While the land management goals for the Brule River State Forest are changing in this management plan, the level of land management actions for the clay plain is similar to or less than the level that has been conducted for many years. This level of management activity has occurred while maintaining high water quality and high aquatic habitat levels so water resource conditions are not expected to change significantly as a result of land management practices. To assure this the plan specifies that every three years aquatic invertebrates will be sampled as part of the Hilsenhoff Biotic Index for water quality within the Brule River and select tributaries.

The management goals described in Chapter Two would produce several positive impacts to water quality and aquatic habitats. This management would maintain most of the land in the lower Brule watershed in a forested landscape or uncultivated grassland both of which protect the clay soils from erosion, hold water on the land and reduce high run off into streams and rivers (Rissman 2000). Forested areas within the Brule River scenic management corridor and steep slopes along streams would maintain forested borders with little or no soil disturbance. The land management actions would require little road building, mostly re-opening of old roads used for past management. This is the primary cause of increased runoff and unnatural bank erosion on the clay plain which is the greatest potential threat to water quality (Rissman 2000). The desired future condition of the lands within the clay plain would be a forest with different age classes but dominated by older trees, and in some areas, an increased conifer component. A watershed with different aged forest stands and some open areas helps to desynchronize the spring snow melt thus reducing the severity of spring run off which can cause erosion (Veery 2001). This management will help to reduce the intensity and frequency of peak flows to the Brule and tributaries, which will protect the aquatic habitat for important game fish species as well as other aquatic animals. Overall the forest management goals for the clay plain will continue to provide a land cover that supports high quality aquatic systems.

If additional lands were purchased within the boundary expansion they would experience similar management depending on the condition of the land when purchased. However, the management goals would be to manage for a diverse forest cover of boreal species with little road construction. Therefore, similar positive impacts to the stream water quality and aquatic habitat would be expected in the expansion area. If other methods such as easements or cooperative agreements were developed instead of fee title acquisition, similar goals of forest management and water resource protection would be sought.

The maintenance or enhancement of wetlands would continue to provide aquatic habitat for wetland plants and animals. It also provides additional water storage within the lower watershed thus reducing surface runoff to the streams and river.

There are a number of recreational improvements for the lower Brule River corridor. Six canoe landings will have wells installed and two will have new pit toilets. These additions, will create safer and more sanitary conditions in and adjacent to the river. The wells and will not have a capacity and use level to impact the groundwater.

Impacts - Sand Soil Areas

This management plan proposes to manage for a variety of natural community types within the landscapes dominated by sand soils. In some areas, the community types will move toward older hardwood dominated forests such as the Mille Lacs Upland while in other areas the community types will move toward a more open less forested habitat such as in the barrens restoration area. Large areas will continue to managed primarily as pine dominated community types similar to present conditions but generally with greater diversity in species and age classes.

This management plan proposes to maintain most of the land within the sand soils of the BRSF in natural communities therefore little negative impacts to water resources is expected. This is particularly important to the Brule River since about 73% of the land currently in state forest ownership is on sand soil.

Some roads for management, fire control and public use will be maintained or rotated in location within the sand soils of the BRSF. Roads generally have the greatest potential to contribute to erosion and maintenance of roads on the sands could cause localized erosion (Rissman 2000). The impacts would be limited to movement of sand soil down hill but generally not into any stream or wetland as the state forest roads are designed to avoid these areas.

The management plan calls for an increase in grassland or open habitats within the sand plain. Generally, forested areas provide better protection against soil erosion than open habitats at specific sites (Rissman 2000, USDA 1988). On the other hand, at the watershed level a percentage of the landscape in open or early successional habitat helps to desynchronize the snowmelt thus reducing peak water flows to the river (Veery 2001). Overland water flow is less of a concern on the sand soils because of the high infiltration rates. Overall, no significant change from the positive current conditions is expected.

Maintenance of natural communities on the sand soils of the BRSF will continue to allow natural water infiltration and stable groundwater movement to the upper Brule which is important to the springs and ultimately the high quality aquatic habitat of most of Brule River system. Overall number of roads will decrease under this plan so any potential erosion problems caused by roads should be reduced. Management practices on the BRSF routinely exceed recommended Best Management Practices for Water Quality by building few roads, conducting management actions further from water resources than recommended, and by planning action for the best time of year to avoid impacts (Rau et al. 1999). These practices will continue to protect the lake, wetland and stream resources within the BRSF.

On the upper Brule there is one recreational developments with the river. The second development is the expansion of the North Country Trail which will involve a boardwalk through an area of the Brule Bog. Construction of this boardwalk will impact wetland vegetation and soil. Some vegetation will be cleared and vegetation underneath the boardwalk will die from lack of sunlight. The total area impacted from the boardwalk is less than one acre.

The improvements to the St. Croix picnic area and boat landing include installation of a small dock to aid in launching boats. This improvement will temporarily disturb aquatic vegetation and increase turbidity.

Terrestrial Vegetation and Wildlife

The following description combines the upland vegetation and wildlife discussions. The discussion is grouped by the ecological landscapes since they are the context for the variations in vegetation and wildlife. Please note that these discussions intentionally exclude discussion of the rarer wildlife and plant species as they are discussed in the next section.

Lake Superior Clay Plain Ecological Landscape

Current Conditions

The Lake Superior Clay Plain makes up about 15,300 acres of the Brule River State Forest (BRSF). The dominate upland community types on the state forest clay plain lands (Management Areas 1-4) are aspen/white birch (60%), spruce-fir (13%), grasslands (7%) and northern hardwoods (5%). Common understory plants include upland alder, hazelnut, big leaf aster and wild sarsaparilla. Balsam fir and red maple are common seedlings and saplings. The purchase and management of clay plain lands for the Brule River State Forest did not begin until the 1960s. The land management emphasis has been to encourage and guide the restoration of a diverse and productive forest and protect the excellent water quality of the Brule River and tributaries. The primary forest management has been to manage the aspen habitat for forest products and wildlife values, to increase the presence of conifers and to maintain the areas of grassland. In addition, small grassy wildlife openings have been maintained in this part of the forest. The aspen dominated habitats have shown a slow decline in cover with balsam fir becoming more dominant in some areas. The grasslands and northern hardwoods have been maintained at relatively consistent levels. The white birch has seen a steady decline across this landscape.

A variety of wildlife species have benefited from this habitat composition and management approach. The aspen habitat in various age classes is favored by two popular game species; ruffed grouse and white-tailed deer. Other wildlife that benefit from this habitat include; fisher, black bear, snowshoe hare, golden winged warbler and several species of common songbirds. The grasslands provide habitat to several wildlife species such as upland sandpiper, sharp tailed grouse, snipe, bobolink and savannah sparrow, red fox and green and garter snakes. Where these grasslands are adjacent to the constructed wetlands they also provide nesting habitat for waterfowl. The wildlife species that benefit from increased conifer habitats or larger closed canopy forests have had limited habitat under these management conditions. Species such as blackburnian, cape may, and pine warblers, wood frogs and blue spotted salamanders can be found in the relatively small areas of conifer dominated or older hardwood forests.

Impacts

The management plan for Areas 1- 4 provides a diverse approach to managing for these upland habitats. The largest portion of the clay plain (~13,000 acres) would experience a management approach to increase the dominance of boreal conifers and increase the age of the forest overall. This is a long-term 100-plus year process to restore a forest dominated by boreal conifers (Eckstein et al. 2001). The long-term goal of creating a clay plain boreal forest landscape is limited by the uncertainty of restoring some of the vegetation components and in managing

sufficient acreage to reach a landscape level restoration. The master plan focuses on restoring the components of target ecosystems while balancing the multiple demands on the BRSF. By focusing in on managing for the components, it limits the evaluating ability for the potential success of ecosystem restoration. However, given the unknowns it presents a good first step toward the long-term goals.

The impact of managing for these habitat goals has differing levels of certainty. The success of reestablishing a dominance of boreal conifers is the most significant uncertainty. Low conifer reproduction and possible dominance of upland alder or hazelnut are concerns. Within the next 50 years the dominance of aspen will see a moderate decline being replaced primarily by balsam fir, white spruce and white pine throughout Management Area 1. However, the significant shift to dominance by these conifers will not be realized until at least 100 years from now (Eckstein et al. 2001). Grassy wildlife openings within blocks of forest will only be maintained in Management Area 3 so wildlife that benefits from this habitat across the clay plain will see a decrease in habitat quality. In contrast, wildlife that benefit from large block forest interior habitats will benefit from a decrease in these forest openings. The management plan also calls for increasing the area of white birch, which was an important historic species on the clay plain. White birch requires regular disturbance and is an early successional species often associated with aspen. The wildlife species associated with the aspen and early successional habitat should show only a small decline in populations resulted from habitat changes within the next 50 years. The loss of habitat will continue to slowly decline with full impacts not likely to be achieved until after 100 years. Those wildlife species which depend on conifers or older forests will begin to see more habitat and bigger blocks of habitat with the next 50 years but will likely not see significant population benefits sooner than 100 years from now.

One area of the clay plain that will continue to be managed with an emphasis on early successional forests is Management Area 3. A 1,400-acre unit, currently dominated by aspen, will continue to be managed with an emphasis on early successional species. Therefore, little change in the forest condition and wildlife habitat is expected.

Management Area 2 currently supports a mixed species forest so the forest and would experience little change in forest composition and wildlife habitat over the next 50 years. The forest would experience a minor increase in conifers and northern hardwoods, a decrease in aspen and a shift towards an overall older forest. This would continue to support the non-game forest interior species listed above as well as rarer warblers listed in the next section. The overall habitat quality for these species should improve under the management.

Large block grassland habitats (about 800 acres overall) and associated species should see little change from present conditions. Species which require larger blocks of grassland habitat such as sharp tailed grouse may not be able to maintain a population on the clay plain grasslands over the next 20 years. In the next planning cycle these grasslands will be evaluated for conversion to forest habitats or maintenance in a grassland condition.

Recreational improvements that will impact vegetation on the clay plain include the Bracket's Corner Picnic area, the improvements to the Old Bayfield Hiking Trail, development of scenic view access at Waino Rock and the closure of some open forest roads. The additional trails, road and parking areas associated with the three recreation locations will permanently remove one to two acres of vegetation. The closure of the woods roads to public access will allow more vegetation to grow into these areas.

Mille Lacs Upland Ecological Landscape

Current Conditions

The Mille Lacs Uplands portion of the BRSF is about 3,400 acres (Management Areas 12 and 13). The dominant upland community types in this area are aspen (55%), white birch (15%), red oak (7%), red pine (7%), and 2% northern hardwood. Hazelnut, blueberry, mountain maple and big leaf aster are common understory species. The age of the forest is fairly evenly distributed across age classes from 10 –100 years old. This area represents a gradual transition into the drier soils of the disturbance-dominated forests on the Bayfield Sand Plain. Very large forest fires altered this area's forest cover in the 1920s, causing large areas dominated by aspen. Much of the oak got its start following these fires but white pine did not fair well. The management emphasis over the last few decades has been maintenance of aspen, white birch and red oak for wildlife and forest product values. Efforts have also been made to increase the northern hardwood type and manage for aesthetic values in specific areas.

The current forest composition provides good habitat to a variety of wildlife species, some that are not found in most other parts of the BRSF. Some of the common songbirds found in this area include chestnut-sided warbler, American redstart, veery, hermit thrush and wood thrush. Songbirds found in the older age classes of this forest include black-throated green warbler, blackburnian warbler, scarlet tanager, and blue-headed vireo while large blocks may also support black-and-white warbler, ovenbird and red-eyed vireo. Other wildlife that benefit from the current forest habitat include, white-tailed deer, ruffed grouse, fisher, black bear, coyote, and snowshoe hare. Wildlife found in the older age classes of this forest include red and gray squirrels, eastern tree frog and wood frog.

Two sites within this landscape represent its transitional nature into the pine dominated forests to the south. The Willard Road Pines and Vapa Road Pines support older red and white pine stands with red maple dominating the young age classes. These sites support some characteristic pine habitat wildlife species such as pileated woodpecker, red breasted nuthatch and pine warbler.

Impacts

Within the Mille Lacs Uplands, two different management prescriptions are being. Management Area 12 will be actively managed for specific natural communities while Management Area 13 will have very limited active management for aesthetic values.

Across this landscape a forest with a greater percentage of northern hardwoods and a greater number of older stands of trees will develop as a result of this management plan. Within the actively Managed Area 12 there will be a decrease in the aspen community and an increase in

northern hardwoods in the next 50 years. Aspen will remain the dominant tree species in Management Area 12. In the passively managed Area 13, it is expected that shade tolerant species such as red maple and sugar maple will slowly replace early successional species such as white birch and aspen. This conversion will not be realized for nearly 100 years. White birch will be maintained in the actively managed Area 12 but will steadily decline in the passively managed Area 13. Within the actively managed Area 12 there will be a diversity of older and younger forest age classes. The amount of dead trees and down woody debris will increase overall in the landscape but will be highest in Management Area 13 as a result of the high mortality expected in old aspen and white birch within the next 50 years.

While most of this landscape will be managed for hardwoods two areas, Vapa Road and Willard Road Pines, with older pine stands will continue to be passively managed as reference sites. Currently, pine regeneration is lacking at these sites and red maple is the predominant sapling. Unless significant natural disturbance such as fire or blowdown impacts these sites, the maple will be expected to replace the older red and white pine as the pines die out. The current wildlife species found at these sites would likely benefit from the present habitat for 50-100years.

The wildlife species currently found in this landscape will continue to find suitable habitat. Those species favoring older age classes and more downed woody debris will find more available habitat particularly in Area 13. Species favoring young age classes will experience a gradually decline in preferred habitat particularly in Area 12.

Bayfield Sand Plain Ecological Landscape

Current Conditions

The Bayfield Sand Plain portion of the BRSF is about 16,400 acres (Management Areas 6-11). The upland community types within this area are red pine 26%, aspen/white birch (24%), jack pine (16%), scrub oak (10%) and grass (2%). Common understory plants include hazelnut, low sweet blueberry, sweet fern, bracken fern and wintergreen. Much of the pine type listed here is in various aged plantations. These figures were generated prior to the 2000 hail storm which caused tree damage and mortality to over 4,000 acres. The management history across this landscape has been primarily to maintain a mix of the dominant community types in support of wildlife habitat, forest fire control and forest product generation. Jack pine was previously more abundant prior to jack pine budworm losses within the last 20 years. The northern areas (Management Areas 6 and 7) of the Bayfield Sand Plain on the BRSF transition into the Lake Superior Clay Plain and Mille Lacs Uplands so they show characteristics of multiple ecological settings.

This landscape supports a variety of wildlife species in the various habitats and successional stages found here. The more open grass habitats support species such as sharp-tailed grouse, clay-colored sparrow, vesper sparrow, grasshopper sparrow, northern prairie skink, hog nosed snake, tiger salamander, thirteen-lined ground squirrel, badger and fox. Areas with increasing scrub oak and other shrubs will still support some of the open species but add species such as the chestnut-sided warbler and snowshoe hare. As in other areas the aspen/white birch habitat in various age classes is favored by two popular game species; ruffed grouse and white-tailed deer. Other wildlife that benefit from this habitat include; fisher, snow shoe hare, golden winged warbler and

several species of common songbirds. The natural pine communities will support hermit thrush, Nashville warbler, purple finch, red crossbill, red squirrels and flying squirrels. Pine plantations offer some habitat to these same species but with less diversity in structure, cover and food. Wildlife such as coyotes and black bears can be found across these habitat types.

Impacts

The management goals for this landscape represent a habitat gradient from an older forest of northern hardwoods and red/white pine in Management Area 6 to open barrens habitat in Management Area 10. This wide range of habitat goals is similar to the present condition except that there will be an increase on the ends of the habitat gradient. Significant areas of aspen/birch, red pine, jack pine and scrub oak will be maintained so only small decreases in the overall vegetation and wildlife habitat in these types is expected. The changes will be seen in older age classes of aspen/birch, northern hardwood and pine in some parts of this landscape. On the other end of the spectrum the barrens and open pine forests will see an increase in acreage over present conditions. Management will be planned to maintain a core area of open habitat with a shifting mosaic of younger and older habitats around the core to maximize values of the open habitat. Open grassland and shrub vegetation will have more available contiguous habitat than under present conditions.

Similarly, wildlife associated with current habitat patterns will likely maintain good populations as large areas of similar habitat will still be available. Wildlife associated with older hardwood and pine forests, such as pileated woodpecker, blackburnian warbler, pine warbler and others listed above will see an increase in habitat in some areas of the landscape. Open habitat wildlife species will see a more stable core area of open grass, shrub and savannah conditions. This should allow their populations to increase and take better advantage of the temporary open habitats offered by timber harvest in the surrounding pine management areas.

The part of the sand plain damaged in the 2000 hail storm will have a somewhat different composition. Over 4,000 acres of forest was impacted by the hail storm within the BRSF. Much of this was in the sand plain landscape but some was in the Brule Bog. About 40% of the impacted area has been salvaged while the other 60% will be left to die or recover naturally. The salvaged area has been treated in a variety of methods in order to regenerate a dry pine or aspen forest. The goal will be to develop a forest primarily of mixed jack, red and white pines with about 25% in aspen. Some areas will be planted while others have been treated to encourage natural regeneration.

The new loop to the Afterhours ski trail will permanently remove one to two acres of vegetation.

The short scenic overlook for the snowmobile trail in Management Area 10 will permanently remove a fraction of an acre of vegetation.

Construction of the group camp will remove mainly shrub and ground layer vegetation form five to six acres north of the Bois Brule Campground. Many of the mature trees will remain. Increased human activity in this area will displace any resident wildlife during the breeding season.

Development of the Devils Hole Ski Trail area will permanently remove about eight acres of vegetation. The use of mountain bikes in this sandy terrain may result in erosion of the trail bed if a significant level of use occurs.

Brule River Ecological Landscape

Current Conditions

Much of the area within this landscape is aquatic or wetland vegetation and thus was covered in the previous section. The areas of upland vegetation are primarily directly adjacent to the river along slopes and terraces. In the lower river much of this is dominated by the balsam fir, white spruce and occasionally white cedar while other stretches have a mix of aspen and balsam fir. These areas have some of the older fir-spruce habitats. These habitats sometimes slope directly to the river while other areas grade into swamp hardwoods or shrub wetlands. In the upper river, the wetland forested habitats are wider in width adjacent to the river before sloping up to primarily older red/white pine and aspen upland forest.

These upland forest habitats are relatively narrow within this landscape and are associated with the upland forests in the adjacent landscapes with regard to wildlife habitat values. In the lower river the older fir-spruce forest provides habitat for various warblers and amphibians that prefer conifer habitat. In the upper river the older pines along the river provide habitat for wildlife such as pileated woodpeckers, pine warblers and rare species listed below.

Impacts

This master plan prescribes little to no active management of the upland habitats of the Brule River Ecological Landscape. This will favor development of old growth boreal and red/white pine communities. In the next 50 years there should be little change in habitat type as these trees age. In the lower Brule the aspen and fir areas will likely succeed to balsam fir and red maple. Development of other conifers will depend on limited available seed sources. In the upper Brule the pine habitat will likely develop old growth characteristics within the next 100 years but may begin to lose the pine component unless regeneration is triggered by a natural disturbance. Little change in the wildlife species is expected in the next 100 years other than an improvement in the existing conditions for species that favor old conifer habitats.

Endangered, Threatened and Species of Special Concern

A comprehensive survey of rare species and natural communities was conducted on the BRSF from 1995-1999 (Epstein et al. 1999). Regular wildlife surveys and follow up inventories have provided additional information (Kessler 199, Wydeven 2002, Epstein 2002). Based on these efforts three state endangered, seven state threatened species and forty-four rare species of special concern were found in various habitats on the BRSF. Generally, the aquatic habitats and wetland habitats supported the greatest number of rare species and the Brule River Ecosystem supported most of the rare species on the property. Some rare species of special concern require habitrats with minimumal disturbance, while others require habitat that is frequently disturbed. The management plan was developed with the habitat needs of these species in mind. The ten listed

threatened or endangered species will be considered separately while the rare species of special concern will be discussed by ecological landscape. Some species have both state and federal protection status which are described below.

Timber Wolf

The timber wolf (*Canis lupus)* is a state threatened and federally endangered species, which has seen significant expansion of its range in Wisconsin in the last 20 years. In the last 5–6 years the use of the BRSF by wolves has increased significantly (Kessler 1999). During the winter of 2001-02 at least two to four different packs with three to four wolves each were using parts of the BRSF regularly (Wydeven 2002). The wolf generally prefers large areas of forest not fragmented by development or agriculture, however, its range in recent years is beginning to expand into less traditional habitats. The packs currently using the state forest are found property-wide in a variety of habitats including aspen, fir-spruce, red pine and open pine areas (Wydeven 2002). Its primary food base is white-tailed deer and beaver both of which are common on the BRSF and surrounding landscape. These species favor a mix of forest community types that include early successional species. The greatest threat to wolves is accidental or intentional mortality from people either shooting them or vehicle collisions. The mix of community types and the continued management of the BRSF in an undeveloped condition should benefit this species. Additional lands acquired in the expansion areas would assure that large tracts of undeveloped forest remain available for this species.

Bald Eagle

The bald eagle (*Haliaeetus leucocephalus)* is a state rare species of special concern and a federally threatened species; however, significant increases in the populations of this species across North America have been the basis for the federal government proposing delisting this species. Historically, this species was impacted by the presence of pesticide contamination in fish, its primary food. It prefers locations where large nest trees are near open water bodies (Epstein et al. 1999). Seven nest records are known on the BRSF. This species is not specific to an ecological landscape or habitat within the forest but is likely to seek large red or white pines as nest sites. The maintenance or development of older red/white pine stands that is prescribed as part of this plan will continue to provide suitable nest sites. Operational guidelines to avoid disturbance to nest trees are regularly followed in all property management activities. The overall protection of water resources as prescribed by this plan will help to protect the foraging habitats for bald eagle, although the greatest threat to these habitats is through residential development and management (fertilizing lawns, removing shoreline vegetation, etc.) of shoreline properties.

Osprey

The osprey (*Pandion haliaetus)* is a state threatened species, which is also a large fish eating raptor with habitat requirements similar to the bald eagle. Three nest sites are known on the BRSF (Epstein et al. 1999). The positive impacts to this species from the management are essentially the same as those described for the bald eagle.

Wood Turtle

The wood turtle (*Clemmys insculpta*) is a state threatened species. This semi-terrestrial turtle inhabits forests next to fast moving streams. Good quality habitat is found along the middle and lower Brule River (Epstein et al. 1999). It nests in exposed areas of sand or gravel and sometimes roadways. The greatest threats to this species are collection, vehicle-caused mortality and disturbance to nest sites. The low disturbance management of forested habitats adjacent to the Brule River should provide maintenance of good habitat for this species. The natural bank erosion characteristic of the lower Brule will likely continue to provide suitable nesting habitat. The increased presence of BRSF law enforcement staff within the property will provide protection against indiscriminate collection or disturbance of the wood turtles.

Arrow-leaved sweet-coltsfoot

The arrow-leaved sweet-coltsfoot (*Petasites sagittatus*) is a state threatened species. Wisconsin is on the edge of this species range, which is centered in western Canada (Epstein et al. 1999, Gleason et al. 1963). It is an inhabitant of open, often disturbed herbaceous/grass wetlands. On the BRSF it was found at two wet areas along Brule River Road and Clevedon Road. This management plan proposes to maintain open herbaceous/grass habitats and constructed wetlands, which will continue to provide suitable habitat for this species.

Lapland Buttercup

The Lapland Buttercup (*Ranuculus lapponicus*) is a state endangered species. Wisconsin is on the edge of this species extensive range of subarctic and boreal regions of North America and Europe (Epstein et al. 1999, Gleason et al. 1963). It inhabits wet wooded habitats. It was located at two sites within the BRSF, both within Management Area 5 in the upper Brule River wetlands. This plan prescribes maintenance of the high water quality and forested wetlands found within this management area so this species should continue to experience positive habitat conditions.

Fairy Slipper or Calypso Orchid

The Calypso orchid (*Calypso bulbosa*) is a state threatened species. Wisconsin is on the southern edge of this species range that is found throughout Canada (Epstein et al. 1999, Gleason et al. 1963). It is found in wet, coniferous forests or coniferous swamps. Several colonies have been found on the BRSF with the largest areas being within Management Area 5 in the upper Brule River wetlands. This plan prescribes maintenance of the high water quality and forested wetlands found within this management area so this species should continue to experience favorable habitat conditions.

Cerulean warbler

The Cerulean warbler (*Dendroica cerulea*) is a state threatened species. Cerulean warblers have been extending their breeding range northward primarily in bottomland hardwoods and in larger blocks of older hardwood forests. There are limited opportunities for suitable breeding habitat on the BRSF and these are expected to remain stable under this management plan.

Common Tern

The common tern (S*terna hirundo*) is recognized as an endangered species in the state of Wisconsin and is protected under the federal Migratory Bird Act. It prefers remote beaches, sparsely vegetated islands, and is sometimes found in marshes. A few breeding colonies are found in Lower Green Bay of Lake Michigan, Ashland and Duluth-Superior area. The common tern does not nest on the BRSF, but uses the Lake Superior beaches as resting areas and forages over Lake Superior in the marsh at the mouth of the Brule River. The closest breeding colonies are near Ashland and Duluth-Superior. These colonies are probably the source of the birds found on the BRSF during the summer. The common tern is endangered due to disruption of breeding colonies, predation, loss of foraging habitat and pollutants. The Master Plan will protect the beach and marsh habitats used by this species.

Caspian Tern

The caspian tern (*Sterna caspia*) is another state endangered species and is protected under the federal Migratory Bird Act. The caspian tern has a widespread distribution in the northern hemisphere, but is a very localized breeder. It prefers to occupy coastlines, large lakes and river areas. There is very limited breeding occuring on islands in Lower Green Bay of Lake Michigan. The caspian tern does not nest on the BRSF but uses Lake Superior beaches as resting areas and forages over Lake Superior. The closest breeding colonies are in Minnesota. The caspian tern is endangered due to disruption of breeding colonies, predation, loss of foraging habitat and pollutants. The Master Plan will protect the beach habitats used by this species.

Dwarf milkweed

The dwarf milkweed (*Asclepias ovalifolia*) is considered a threatened species in Wisconsin. Its ranges is from Saskatchewan through the northern Great Plains, east to Wisconsin and northern Illinois. It is typically found in open pine and oak barrens and sand prairies. Extant populations are found in sandy areas of central and northwestern Wisconsin. One small populations has been documented at the edge of a pine plantation in a former pine barrens habitat in the Gordon Annex on the BRSF. Excessive shading, encroachment by invasive plants and grazing are conservation concerns for the continuing existence of the dwarf milkweed. The BRSF master plan actions will have no adverse impact on this species.

Species of Special Concern in Ecological Landscapes

Brule River Ecosystem

The Brule River Ecosystem includes the Bois Brule River, its tributaries, the Brule Spillway and Brule Bog. For the purposes of this discussion, we are including the lands directly adjacent to the river. Over half of the 44 rare plants and animals found on the BRSF were located within Management Areas 4 and 5 (Epstein et al. 1999). At least eight rare aquatic plants and four rare aquatic invertebrates are found in the river/stream or wetland habitats with this system. The emphasis on protection of the water quality and habitat of the river and associated wetlands should continue to provide good habitat for these species. One area of concern may be the impact of large numbers of anglers or paddlers damaging habitat of local populations of aquatic plants or

invertebrates. These impacts are not expected to cause system wide changes in available habitat for these species but could impact specific sites. The plan calls for preventing potential erosion from fisherman access trails along the river, educating river users on the river resource and its proper use and increasing the presence of state forest law enforcement rangers on the forest to mitigate this impact.

Several rare bird species are found primarily in conifer habitat associated with the scenic river corridor or the Brule Bog habitats of Management Areas 4 and 5 (Bartelt et al. 1999, Epstein et al. 1999). Suitable habitat for these birds should increase for some of these bird species. Gray jays, cape may warblers, and yellow-bellied flycather are all species, which breed primarily in conifer habitats of Canada and are therefore rare in northern Wisconsin because it is on the southern edge of their breeding range. Pine siskins and evening grosbeaks are similarly more northern breeders and their presence in Wisconsin is often more dependent on periodic changes in food supply than available habitat here (Hoffman 2001). The black-throated blue warbler is also at the edge of its range in Wisconsin being more common to the north and east. This warbler should also benefit from older forests, larger forest patches, and in some cases, additional conifer habitat. The Northern Goshawk is a rare nester in Wisconsin and one nest was located on the BRSF in an older conifer stand. Under this plan the BRSF will maintain the conifer habitat for these species along the Brule River and increase conifer habitats in the clay plain.

Lake Superior Clay Plains Ecological Landscape

The rare species found in conifer habitats noted above in Management Areas 4 and 5 will likely find increased opportunities in the long-term for habitat on the clay plain under this management plan. One additional rare bird that uses conifer habitat is the Merlin. One nest location was found on the BRSF and it is known to nest on the south shore of Lake Superior (Epstein et al. 1999). It may take more than 50 years to realize significant increases in boreal conifer habitat on the clay plain for these species. The maintenance of grasslands may impact the landscape level forest habitat quality to species seeking large blocks of forest, however, the grasslands also offer habitat to several rare grassland species.

The large block grasslands provide habitat to rare species and in some cases the habitat value of the grassland is increased by its association with the constructed wetlands (Epstein et al. 1999, Kessler 1999). Sharp-tailed grouse, upland sandpipers, and northern harrier are three species that are found in this grassland habitat. The availability of this habitat for these rare species will remain, however, the size of these areas may be insufficient to sustain a viable breeding population of these grassland birds. In addition, the plan calls for evaluating these sites for forest restoration in the next planning cycle.

Wetlands located on the clay plain are both natural and constructed representing emergent marsh, shrub and forested types (Epstein et al. 1999, Eckstein et al. 2001). The American bittern, and vasey rush (*Juncus vaseyi*) are two rare species that will benefit from management for the emergent marsh habitats as well as those species mentioned in the above paragraph on grassland habitat. These wetland habitats will be maintained or enhanced under this management plan.

The Sugar Camp Hill area is within the clay plain but supports a northern hardwood community type. The large roundleaf orchid (*Platanthera orbiculata*) and forest interior warblers such as the black-throated blue warbler and cerulean warbler are found in this area (Epstein et al. 1999). Management of this area toward a managed old growth mixed hardwood/conifer forest should benefit these species. Full benefit of these management goals would not be realized for at least 100 years as aspen dominated areas are gradually converted to northern hardwood and conifer types.

Mille Lacs Upland Ecological Landscape

Few rare species were found in this ecological landscape during recent surveys, however, it represents a relatively small portion of the BRSF. The four-toed salamander was found in the wetlands of this ecological landscape (Epstein et al. 1999). It favors mature moist hardwood forests with wetlands required for breeding. These conditions are limited on the BRSF but the management prescribed for this area should maintain or increase suitable habitat. Management actions, which significantly open the canopy, near appropriate breeding wetlands could negatively impact site specific habitats. This potential impact will be mitigated by leaving canopy coverage adjacent to these wetlands. The autumnal water starwort was also observed in wetlands of this area.

Bayfield Sand Plains Ecological Landscape

Rare birds, plants and invertebrates have been recorded in this ecological landscape within the BRSF during recent surveys. Jack pine forests constitute one of two primary habitats for the Connecticut warbler in Wisconsin. The impact of the jack pine budworm and recent hail storm mortality reduced available habitat for this species but prescriptions outlined in this management plan should increase available habitat on the BRSF. The upland sandpiper favors the open habitats as noted in the clay plain discussion above. The management prescription for the sand plain provides for developing a 600-acre core open barrens or savannah habitat which would be favorable to this species, however, the relatively small size of this open area limits the habitat quality. This habitat will also benefit the sharp-tailed grouse and the Richardson sedge (*Carex richardsonii*). Purchase of additional lands in this area would increase the capability of providing large blocks of habitat for these open habitat species. The several rare invertebrates are all associated with aquatic or wetland habitats which will be protected as part of this management plan and continue to provide habitat for these species.

IMPACTS TO AESTHETIC RESOURCES

Current conditions

The Brule River State Forest is generally recognized as one of the most scenic of the Wisconsin State Forests. The portion of BRSF that is most highly valued for its scenic quality is the area along the Bois Brule River. The Bois Brule River stretches approximately 44 miles from its headwaters to its mouth at Lake Superior. The scenery along its winding course includes rapids, wetlands, and lakes surrounded by mature conifer forests. It includes views of historic cottages, whitewater rapids and ledges flowing through steep and heavily vegetated banks, to a quiet marsh and lagoon near the Lake Superior shore.

The reasons given for visiting the BRSF are often related to the river and its inherent scenic beauty. Two of the most popular recreational activities, canoeing/kayaking and fishing, in the BRSF focus on the river; with an estimated 42,000 paddler and 33,000 angler visits annually. Visitors have consistently indicated that the scenic quality of the river corridor is a key aspect for both of these recreational experiences. Having the scenic quality of the Brule River Valley and River corridor are also important scenic resources to private property owners.

Several other recreational activities that are closely linked to the experience of natural scenery include: camping, hiking, biking, and wildlife viewing. Visitors value the areas where these activities are located. Hence, the areas of BRSF adjacent to trails, as well as, the areas surrounding campgrounds and individual campsites are also highly valued. Those visitors who choose to, or are physically limited to, driving through the forest can also enjoy the BRSF's scenery. Therefore, the scenery along some public roads that extend along or through the forest, are also important scenic resources.

A discussion of the scenic resources of the BRSF would not be complete without mentioning several locations where a visitor can experience scenic vistas. The area at the mouth of the Brule River, where it meets Lake Superior, provides a particularly scenic panorama. Here a visitor can enjoy sunrises and sunsets with long vistas to Lake Superior and along its shore. Another vista can be enjoyed by hiking out from CTH H to Waino Rock. This area is currently undeveloped and is unknown to most visitors. It provides another panoramic view over the Brule River Valley and across to Sugar Camp Hill. This vista can be particularly beautiful during the fall color season. A third vista is located at the end of a trail that leads from the Portage Trail, out to view of the Brule Bog. This vista would be most appreciated by those interested in pristine wetlands and the wildlife that inhabits them. Another easily accessed vista is located on CTH P south of Stone Chimney Road. This view looks east across the Brule Bog. Other scenic vistas can be enjoyed along the snowmobile trail and the Afterhours Ski Trail.

Current Management of the Scenic Resources

The 1979 Master Plan designated an area approximately 3,200 acres in size as an "Esthetic Management Zone." The limits of this zone were defined as the area : 400 feet on either side of the Brule River; 200 feet on either side of all Federal, County highways, selected town roads and streams; 400 feet around Superior, St. Croix, and Minnesuing lakes (not in a mere restrictive zone) and all intensive recreation areas." The 1979 Master Plan defined the "Management Guidelines" that "this zone will be managed in accordance with the Esthetic Management Handbook" which, at the time was being developed by a committee formed by the DNR – Bureau of Forestry. It was completed in 1985 and published by DNR under the title *Forest Aesthetics: management considerations and techniques* handbook (Sloan 1985). The 100 page handbook provides "a practical, on-the-ground, guide to help foresters meet varying aesthetic management objectives in diverse timber types.

From the development of the 1979 Master Plan to the present time, the DNR has implemented aesthetic practices beyond what was prescribed in the 1979 Master Plan. For example, individual and groups of "leave trees" have been left in clearcut areas to improve the aesthetics, provide habitat for some wildlife species and provide a seed source for desired trees. Red pine plantations have been thinned to create a more natural appearance and minimize the "row effect." Reforestation efforts have graduated to a more natural method rather than the furrow and plant methods previously used. In some instance, trees of desired species were planted to establish a seed source for ecological and aesthetic goals.

Also, in the time between the implementation of the 1979 Master Plan and the present, the amount of clearcutting has declined. This shift in management was made in response to changes in the forest, input from people that use the forest and increasing public demand for a more natural appearing forest. At the same time there are still intensively managed areas, such as grasslands, ponds, and aspen management areas, that are maintained specifically for wildlife habitat.

Lands Located in the Boundary Expansion Areas

This analysis reflects the final boundary expansion area of 32,000 acres that was approved by the Natural Resources Board in December of 2002. The lands located within the boundary expansion areas, approximately 88% of these lands are industrial forestlands, 9% are wetlands and 2% are in private, non-industrial forestlands. Scenic resources on these lands generally reflect the different primary goals of the landowners based on their current use. The industrial forestlands consist primarily of pine plantations of varying ages in the south and aspen management in the north. The wetlands areas are in natural or semi-natural condition, as are the private, non-industrial forestlands are mostly wooded. The more scenic portion of the Northern Boundary Expansion Area is the riparian zones along several streams that flow north to Lake Superior. The Southern Expansion Area's more scenic portions are the areas surrounding several small lakes in the southeastern corner of the area.

The scenic resources on these lands included in the Boundary Expansion Areas are currently being managed by the current property owners. On industrial forestlands, the current management focuses on the production of forest products instead of scenic quality. The remaining wetland and private, non-industrial forestlands, except in more developed areas, are currently managed to maintain the natural conditions of these lands.

IMPACTS TO SCENIC RESOURCES

Property-wide Impacts to Scenic Resources

As provided in the section of the master plan titled "Property-Wide Management Provisions – Scenic Resources Management", the aesthetic management guidelines would be followed as outlined in the "Silviculture and Forest Aesthetics Handbook" – 2431.5. The only areas where these guidelines would not apply would be in management areas where specific management has otherwise been designed to address scenic values. These guidelines would be used property-wide as a minimum level of protection of scenic resources. The 1979 Master Plan applied these management guidelines to the entire 50,000 acres of the property, except in areas where specific management has otherwise been designed to address scenic values.

Nearly 5,000 acres of the state forest is designated in this master plan. In these areas, management will primarily focus on aesthetics values. Generally large trees, low levels of management and increased conifer or northern hardwood areas will be the result. These scenic management areas focus on the lands adjacent to water resources, such as the Brule River and Lake Minnesuing. These are locations where users have expressed an interest in maintaining or developing these conditions and so the management will increase the desired scenic conditions.

The 2002 Master Plan also proposes the following management goals as a means of preserving and enhancing the scenic quality of the existing forest:

- Develop more large and older trees; especially white and red pine, balsam fir and oaks.
- The "naturalization" of old maturing plantations
- A greater mix of tree species with in many forest stands, especially more conifers in some sites currently dominated by aspen trees, and an increase in the mix of stand types and age classes in several of the management areas. Attempts would be made to maintain white birch, which is declining.
- A reduction in the size and number of clearcuts
- Where structurally or financially feasible, new recreation structures will have a rustic, CCC era style consistent with the historic character of the Bois Brule River Valley.

Therefore, the master plan would result in the scenic resources within a substantially larger area being maintained and enhanced relative to the management of the property under the 1979 Master Plan.

The Scenic River Corridor

Under the master plan the outstanding, natural scenic quality of the river corridor will be maintained and enhanced over time through designation and management as either a scenic or native community management area (Refer to the Land Classification map in the Map Section in the back of the document and Chapter Two – Management Areas 4 and 5). Little or no timber cutting or vegetation management would occur on state owned land adjacent to the Brule River from the headwaters above the Brule Bog to the river's mouth except to maintain public safety, to maintain existing facilities, or to control invasive non-native plants. In many areas, the designated "no cut zone" along the river is expanded from what was specified in the previous master plan as an "Esthetic Management Zone." The upper river and bog, upstream of CTH B, would be within Area 5 – The Brule River Bog and Spillway Native Community Management Area. Timber harvesting in this management area would be limited to thinning pine plantations on the upland ridges to create a more natural appearance.

State lands along the lower river, from CTH B to Lake Superior would be within Area 4 – The Brule River – Scenic Management Area. These lands would be managed as a scenic management areas (Refer to the Land Classification Map in the Maps Section at the back of this document) with little management activity. Along each side of the river the management area extends to a management line corresponding to the topography and vegetation change found where the slopes leading to the river flatten out to a more level upland or a minimum of 400 feet from the river's edge whichever is greater. Under the 2002 master plan there would be no active land or forest management activities along the river corridor, except to remove trees which pose a public safety hazard, exotic plant control, timber salvage to restore scenic conditions, or vegetation management associated with maintaining campgrounds landing and other public facilities along the river.

As a result of the scenic river corridor management, there would be no adverse impacts to scenic resources in this area, relative to the previous management on the property.

Impacts to Scenic Resources Resulting from Future Recreational Facilities

The Master Plan proposes to maintain the current recreational facilities with approximately the same level of capacity, with the following exceptions. The Master Plan will: expand the Afterhours Ski Trail, construct a scenic overlook at Waino Rock, construct a new picnic area near Bracket's corner, construct a new Devils Hole Pines cross-country ski trail near Samples Road, add a short 200 yard loop to the existing snowmobile and winter ATV trail. See Chapter Two for a description of these facilities. Other minor recreational improvements are also included.

<u>Afterhours Ski Trail Expansion</u>

The Master Plan will expand the Afterhours Ski Trail by building an additional section of trail that would form a short loop. This would provide additional loop trail opportunities as described in Chapter Two – Management Area 6.

The Department had proposed two new footbridges to cross the river and connect the Afterhours Ski Trail to the Ranger Station. This would have provided an additional loop trail, permitted management of the trail from the forest headquarters and provided greater opportunity for skiers and hikers to enjoy the beauty of the Brule River. However, during the final public input period, there was strong opposition to installing the footbridges so the Department removed the footbridges from the Master Plan that was presented and approved by the Natural Resources Board on December 4, 2002.

Waino Rock Scenic Overlook

The Master Plan will propose to construct a scenic overlook at Waino Rock, located on the west side of CTH H, one-half mile south of CTH FF. A small, six to eight car parking lots would be constructed along the west side of CTH H and a trail would be built, extending approximately one-half mile west to the Waino Rock Overlook (the Promontory). This half-mile trail would be a five foot wide, lightly developed trail with primitive surfacing and require minimal grading. The trail would lead visitors through a combination of open and wooded areas to a large rock outcrop, which serves as a viewing area and provides natural seating. The panoramic view form the overlook extends to the west across the Brule River Valley and on a clear day extends north to Lake Superior. The scenic quality of the overlook area would be kept in its natural condition and no additional facilities would be provided.

This action would result in better access to the Waino Rock Overlook and would enhance the public's enjoyment of the forest's scenery. Any adverse impacts resulting from the construction of the parking area could be mitigated by providing a vegetation buffer between the parking area and CTH H.

View from the Waino Rock Overlook

Devils Hole Cross-country Ski Trail

In Management Area 8 of the Master Plan, a cross-country ski trail will be constructed east of Samples Road, approximately one and on-half miles south of Troy Pit Roads and HWY 27. The current forest cover of this area is dominated by read and jack pine plantations and natural stands of jack pine and scrub oak. Refer to Chapter Two, Management Area 8 – Recreation Management Prescriptions for a description of this area. The 20-25 miles trail system would include a 100-car parking lot, and architecturally rustic style warming shelter with flush toilets and a separate and concealed maintenance facility. The parking area will be a grass area clearing.

Impacts resulting from the construction of this facility would include the permanent removal of approximately 30 acres of vegetation for the parking lot, structures and trail. Existing wood roads will be used where possible and reduce the area impacted. The ski trail's construction would be limited to the clearing of small trees and undergrowth along side the trail, approximately 16 feet from the trail. The trail would also avoid and preserve the larger, older trees and other scenic natural features.

Only the entrance to the parking area would be visible from Samples Road due to the 30-foot wide buffer of vegetation between the parking lot and road. The area cleared for the trail would not be visible from other roads, trails or recreational facilities. The trail would also be aligned to preserve the larger, older and more picturesque trees and other scenic natural features.

The construction of the Devils Hole Trail system would enhance the aesthetic experience of skiers and mountain bike riders by providing a new location to experience the BRSF. The skiing and biking experience would differ from the Afterhours Trail because it would be more spread out and provide a more varied terrain. It would also help alleviate crowding at the Afterhours Trail that occurs during the times when the BRSF had some of the only skiable trails in the state. Adverse impacts to the scenic resources of this area would be minor due to the mitigating measures taken during construction and management.

Proposed Canoe Landing at County Highway FF

In Management Area 4, a new canoe landing and parking area expansion was proposed for construction at CTH FF. The construction of the landing and parking expansion would have impacted the existing aesthetic resources as the result of the permanent removal of small trees and undergrowth in an area approximately 60-feet by 50-feet for the parking of eight to ten additional vehicles. There would also have been some clearing of vegetation along the shoreline to allow adequate room for a landing. The landing would have been designed to maintain a natural and rustic quality, with a minimum of structures visible from the river, and retain existing vegetation wherever possible. It would have been similar in appearance to the Pine Tree Landing. However, during the final public input period, there was strong opposition to this landing so the Department removed the proposed landing from the Master Plan that was presented and approved by the Natural Resources Board on December 4, 2002.

Loop Extension of the Existing Snowmobile and Winter ATV Trail

In Management Area 10 - The Pine Forest and Barrens - Native Community Management Area, a loop trail and scenic overlook is to be added to the segment to the existing snowmobile trail and winter ATV trail that parallels the Brule River. Refer to Chapter Two – Management Area 4 – Recreation Management Prescriptions for a description of this facility.

The loop will be approximately 200 yards long and would lead riders to a scenic overlook of the Brule Bog located on the terrace adjacent to Jerseth Creek. The aesthetic impacts resulting from the trail's construction would be limited to the clearing of small trees and undergrowth in an area 16-feet wide and 200 yards long. This area would not be visible from other trails, roads or recreational facilities. The trail would only be used during the winter months. The construction of this trail extension would provide access to a scenic overlook and would enhance the public's enjoyment of the Brule River Valley's distinctive scenery. An impact of this action would be a minor increase in noise from the operation of snowmobiles and ATVs during winter months in this area surrounding the trail loop.

Impacts to Forest-wide Aesthetic Resources

Nearly 7,000 acres or about 25% of the current acreage of the state forest is designated as scenic management in the Master Plan. In these areas, management will primarily focus on aesthetics values. Generally large trees, low levels of management and increased conifer or northern hardwood areas will be the result. These scenic management areas focus on the lands adjacent to water resources, such as the Brule River and Lake Minnesuing. These are locations where users have expressed an interest in maintaining or developing these conditions and so the management will increase the desired scenic conditions.

In addition to these scenic management areas, the aesthetic considerations will be part of the planning in management areas with other primary objectives. These considerations will be incorporated into management according to the guidelines in the *Forest Aesthetics: management considerations and techniques*. (Sloan 1986) Where possible, visual impacts of timber harvest, prescribed fire, ground treatments and planting will be avoided or minimized along roads and trails.

Some lands adjacent to road and trails, as well as the more remote parts of BRSF will experience a variety of vegetation management practices which will remove vegetation and result in significant visual impacts. Normally, these impacts last from two to five years before substantial vegetation covers the site. Most management actions will alter the forest cover by removing some trees or regenerating/planting new trees. In the barrens area of Management Area 10, some areas will have the forest cover reduced in favor of a grass/shrub habitat which will provide more wide open vistas.

Overall the management prescriptions are designed to:

- Develop more large and older trees (especially white and red pine, balsam fir and oak).
- The “naturalization” of old maturing plantations.
- A greater mix of tree species within many forest stands, especially more conifers in some sites currently dominated by aspen trees, and an increase in the mix of stand types and age classes in several of the management areas. Attempts would be made to maintain white birch, which is declining.
- A reduction in the size and number of clearcuts
- Where structurally or financially feasible, new recreation structures will have a rustic, CCC era style appearance consistent with the historic character of the Bois Brule River Valley.

IMPACTS TO CULTURAL RESOURCES

Current Conditions

Several important and prominent cultural sites and a number of other lesser-known sites, exist on the Brule River State Forest. Some of these sites date back to the area's earliest inhabitants, while other sites represent the struggles and accomplishments of people through the mid-20th Century. Together they represent thousands of years of human occupation of the Brule River watershed.

As the cultural sites are discovered, they are inventoried for the inclusion in the Archeological Site Inventory that is maintained by the Wisconsin State Historical Society. Each site is designated a state number (47 represents Wisconsin), a county designation (DG refers to Douglas County), a site number, and if applicable, a site name. The site locations are not described in this document in an effort to protect their contents, historical significance or context.

The following sites have been inventoried within the existing property boundary of the Brule River State Forest:

47-Dg-15, Solon Springs: This pre-European campsite or village is not well documented and the exact location remains in question.

47-Dg-22, Brule Campsite: This pre-European campsite is unnamed and virtually undocumented, except for the fact that it exists.

47-Dg-23, Ojibwa Village and Clevedon Settlement: The Ojibwa Chief O-Suagie's village was in this area. In 1880 about 30 families of settlers from England built homes and other buildings here. This was known as the Clevedon Settlement. By raising various crops, tending new fruit trees, and exporting lumber they were able to support themselves for about six years. The area was logged shortly after. Reportedly a few of the Clevedon settlers' graves have been found in the area.

47-Dg-89, "90W15" This site is near a riverbank and has yielded some evidence of stone implement work.

112, Brule-St. Croix Portage: This trail, connection Lake Superior and the Brule River with the St. Croix and Mississippi Rivers, is well known by many local residents, visitors, and historians. It is entered on the National Register of Historic Places. Oral history notes its use prior to European exploration of the region. European explorers and settlers have recorded its use, and it is well known as a fur trade route that was active through the time of the American Civil War.

Burial Sites: One homestead burial site and the Rest Haven Cemetery have been documented within the current BRSF boundary.

Historic Structures: A large number of historic structures occur within the boundary of the Brule River State Forest. These range from remnants of stairways and foundations of bridges, boathouses, homes, resort lodges, a ranger station, and a 1930s era Civilian Conservation Corp (CCC).

Other Sites: The Wisconsin Archeological Atlas notes three additional sites. These are a trail along Smith Creek to its confluence with Lake Superior, an early campsite in proximity to Mays Rips Rapids and a battlefield in the general vicinity of HWY 2. Small-scale surveys in the early 1990s found no artifacts in these areas. Other sources provide scant information on the existence of the Percival Mine, a homestead upstream of Long Riffles, an old schoolhouse and the Pine Ridge Cemetery.

DNR staff also conducted a review for archeological information for the areas designated in the BRSF Master Plan for potential future acquisition. The only archeological sites recorded are the Highland Memorial Cemetery, and early clapboard house and a cluster of farmstead buildings. While located within the boundary expansion area, the DNR does not wish to, and by state statute may not seek to purchase cemeteries. Lands within the boundary expansion areas would only be purchased on a willing-seller/willing-buyer basis. Should DNR purchase land under this circumstances that contains a historic structure, the structure would be preserved and protected in accordance with state protection guidelines.

The relative scarcity of sites may result from the fact that the acquisition zone lies away from the river and also that much of this area has historically been in commercial timber production.

Impacts

The activities with the greatest potential to impact cultural resources are those actions that would remove soil. These include road construction, development of parking lots or the installation of buildings such as restrooms. Other activities such as active management to change plant community types on forest lands could also disturb sites through the use of heavy mechanized equipment. Installation of educational signs, commemorative markers, and other structures could potentially mar the cultural value or spiritual sanctity of certain sites. Merely visiting some sites could also be seen at times as a form of desecration.

DNR Manual Code 1810.1 provides guidance that helps to ensure that culturally significant areas are not harmed when property managers engage in a wide range of management activities. The property manager maintains a register of all known cultural sites, as well as a set of maps that highlight areas most likely to contain as yet unrecorded archeological sites. The manager consults this record while planning any forest management activity, including preparing timber sales and designing new structures or facilities. The BRSF manager also ensures that archeological reviews are conducted on all construction sites. Very little road construction is called for in this plan and would follow established historical preservation guidelines in DNR MC1810.1. The construction of parking lots or buildings would require additional site specific

investigations to assure that no cultural resources are impacted. For this reason, the Master Plan should have no negative impact on known cultural resources.

Interpretive or educational activities and facilities would be carefully planned with the goal of enhancing protection, as well as public understanding, of cultural sites. Thus, cultural sites used for interpretive or educational purposes should not be degraded. Care would be taken to maintain the cultural and environmental context of sites.

Fire prevention, suppression and forest management activities would help minimize the danger of fire to vulnerable structures. DNR staff evaluate and manage fire risk in forests and adjacent to residential areas in order to protect life, property and natural resources. They work in cooperation with local fire departments to prevent or suppress fires that could cause damage to structure including those with historical features.

Acts of private individuals in maintaining, landscaping, or transferring ownership of privately owned structures of historic or aesthetic significance could also impact cultural resources. However, these types of actions by private owners are not within the scope of the BRSF Master Plan and thus are not addressed in this impact analysis. Citizens concerned with these issues may enlist the involvement of local or state historical societies or similar groups. If these resources wee within the state forest project boundary and were acquired by the state, then they would follow state protection guidelines.

IMPACTS TO RECREATIONAL RESOURCES

Impacts to Local and Regional Resources

The Master Plan proposes to generally maintain the existing types and amounts of recreational opportunities with little change. Changes in the Master Plan that would affect local and regional recreational resources are discussed below:

River-based Recreation
The Master Plan would maintain the majority of the river's recreational opportunities at their current level. Canoeing/kayaking and fishing will continue to be popular. During periods of peak use, crowding and user conflicts will continue to occur on the river. Use is expected to grow at a slow but steady pace bringing additional pressure in the future. The Master Plan to implement an educational program and provide additional staffing and the posting of "quiet zones" at all landings. This may help to reduce the noise levels and the number of conflicts between river users and between river users and private riverfront landowners.

The monitoring of the level of use of the river to gather data should help guide strategies in reducing use impacts and social conflicts in the future. The impacts to local recreational resources resulting from these actions would be expected to gradually spread-out the number of paddlers on the river during peak use periods and reduce the current level of user conflicts. On a regional scale, the resulting impacts to the recreational resources and opportunities would be minimal.

A canoe landing was proposed to be constructed where CTH FF crosses the river. The construction of a new landing at CTH FF would be expected to result in an improved distribution of paddlers on this popular section of river and a reduction in the crowding at the HWY 13 Landing. The location of the proposed landing at CTH FF was near the downstream end of the river, making it a less likely launch site, and more likely a take-out site. As a take-out site, it would allow weary paddlers to take-out before several sets of rapids. It would therefore be expected to provide a safer and shorter paddle from the more popular launching sites up river, and to alleviate the crowding at the HWY 13 Landing. The relatively short trip on this section of the river (approximately four miles) would not be expected to be a popular trip for those visitors renting canoes (B. Carlson 2002). There would be a potential for paddlers, seeking fast water experience, to use this location as a launch site and use HWY 13 Landing or the mouth of the Brule landings as take-out sites. Any increase in this type of use would likely be offset by the paddlers taking-out at the CTH FF Landing. Therefore, it is not expected that the construction of the CTH FF Landing would result in a net increase in the number of paddlers from the current numbers.

The impact of the CTH FF Landing's construction to the recreational opportunities for canoeing and kayaking on a regional scale would be minimal. The recreational opportunities for anglers would be expected to remain at or near current levels. Therefore, impacts to local and regional recreational opportunities for anglers would be minimal. Public response to this was mixed.

However, local response was mostly against the landing. In response to the public opposition, the proposed landing was removed from the master plan that was presented and approved by the Natural Resources Board on December 4, 2002.

Non-motorized Trail Use
Impacts to local recreational resources/opportunities for non-motorized trail use would be minor. Generally, the number of mile of non-motorized trails would remain the same, except for the following additions. The total length of cross-country ski trails in the BRSF would be increased by approximately 25-30 miles. These trails would also be used as hiking trails during the warm season. There would continue to be no developed horse trails, however riders would be able to continue to enjoy remote roads within the BRSF. The overall additions to non-motorized trails in the BRSF would have a minor impact regionally, but provide a significant increase in these recreational opportunities on a local level.

On a regional level the amount of cross-country ski trails would increase from 1% to 3.7%. The amount of regional hiking trails would increase from 2% to 3.8%. Therefore, on a regional scale, these additional would have minimal impacts.

Motorized Trail Use
Impacts to local recreational resources/opportunities for motorized trail use by snowmobiles and ATVs would be minimal. Generally, the Master Plan proposes to maintain the number of miles of motorized trails, except for the following additions. A 200-yard long loop is to be added to the existing snowmobile and winter ATV trail. The total length of snowmobile and winter ATV trail in the BRSF would be increased from 16 miles to 16.1miles. Regionally a total of 1,571 miles of snowmobile trails and 988 miles of ATV trails are available for public use. Therefore, on a regional scale, the impacts to the motorized trail recreational opportunities would be minimal.

Hunting
Generally, the Master Plan proposes to maintain the number of acres of land open to public hunting, except for the potential long-term addition of the boundary expansion areas. The majority of these lands are currently enrolled in the Managed Forest Laws (MFL) Program and are open to public hunting. The potential increase in lands open to public hunting would occur over many years and the amount of increased acreage would result in minimal impacts on both a local and regional scale.

Hunting recreation on the BRSF is dominated by ruffed grouse and white-tailed deer hunters. Early successional habitats favored by these species will slowly decline on the property with a significant impact to wildlife. The impact is not expected for over 50 years. This will gradually result in fewer hunting opportunities, particularly for ruffed grouse. There will be a slight increase in available habitat for sharp-tailed grouse and even greater potential if more land is purchased in the southern boundary expansion area. Other hunting opportunities will remain unchanged.

Camping
The Master Plan plans to maintain the BRSF's current rustic campsite character and capacity; except for the reconfiguration of the Copper Range and Bois Brule Campgrounds and the addition of a group camping area adjacent to the Bois Brule Campground. The reconfiguration of the Copper Range and Bois Brule Campgrounds would maintain the approximate number of camp sites but would provide increased spacing and buffering between the sites. The campsites would remain "rustic" in nature. The group camping area would add four group sites, each capable of accommodating up to 20 campers with rustic facilities. The existing capacity of the camping facilities is approximately 258 campers. This would increase to 278 campers with rustic facilities. Impacts to local recreational resources providing rustic camping would be minor as a result of the campground reconfigurations and the additions of a group campground. The majority of privately owned campgrounds provide modern camping facilities. On a regional scale, the campground reconfigurations and the addition of the group camping area would result in minimal impacts to recreational opportunities for rustic camping.

Educational / Interpretive Facilities
The Master Plan plans to add the following educational / interpretive elements:

- Construct a rustic log shelter on the terrace north of the headquarters building for use during education programs. The shelter would be approximately 24' by 36' in size, with wall that can be screened in summer and enclosed in winter.
- Add labeled markers to the Stoney Hill Nature Trail, located adjacent to the Bois Brule Campground to interpret the theme of the unique cultural history of the Brule River Valley.
- Relocate the Historic Portage Trail marker to the St. Croix Lake Day Use Area. Impacts from these improvements are minor and primarily positive. Relocating the historic marker would make it more visible and subsequently more frequently read by visitors. Consequently, more visitors would be aware of the important history of the Portage Trail and the Brule River.

On a local scale, the increased educational and interpretive recreational opportunities would be significantly increased. As mentioned in the "Impacts to Cultural Resources" section, they would all enhance the educational aspect of the visitor's recreational experience. On a regional scale, the increase in educational and interpretive recreational opportunities would be minimal relative to those opportunities provided by the federal lands such as the Chequamegon-Nicolet National Forest.

Boat Landing Facilities
The Master Plan plans to maintain the existing public lake boat landings, except for a new pier that is to be constructed at the St Croix Lake Day Use Area. The impact of the fishing / launching pier to the local and regional resources would be minimal.

Picnic Areas
The existing number of and capacity of picnic areas would increase slightly. Currently, there are three picnic areas in the Brule River State Forest. One at the mouth of the Brule overlooking Lake Superior; another adjacent to Bois Brule Campground; and a third is on Lake St. Croix.

Each picnic area has grills, picnic tables, water, and pit toilets. A single picnic table and grill is also provided at Stone's Bridge Canoe Landing for users of that facility.

The Master Plan proposes to add two picnic tables to the Rush Lake site and four tables to the St. Croix Lake Day Use Area. It is also to add a new picnic area at Bracket's corner. The new picnic area would accommodate existing user traffic at his site and decrease some user pressure on the Brule River Road site. This would result in a minor impact to the local and regional recreational resources.

Forest-Wide Recreational Opportunities

Other forest-wide (off-trail) recreational opportunities include activities such as: trapping, berry-picking, mushroom picking, sightseeing, wildlife viewing, and snowshoeing. The areas where visitors choose to do these things are often the portions of BRSF where there are no other intensive uses. The Master Plan proposes to maintain these areas for the uses described above. The primary change in the Master Plan, that would affect forest-wide recreational opportunities, is the Property Boundary Expansion. If, in the very long-term, the Boundary Expansion Areas were acquired from willing sellers, the total acreage available for these activities would increase by 41,000 acres. Therefore, the impact to local forest-wide recreational opportunities would be minor in consideration of the timeframe. Regional impacts would be minimal.

IMPACTS TO LAND OWNERSHIP AND LAND USE

Current Land Ownership of Lands within the Existing Property Boundary

The current BRSF property boundary includes approximately 50,000 acres:

- Approximately 41,000 acres of that area is currently in state ownership
- Approximately 9,000 acres are in private ownership

Current Land Use / Land Cover within the 1979 Property Boundary

Of the 41,000 acres currently in state ownership, the majority of this area is used for public recreation, forest production and tribal off-reservation hunting, fishing and gathering.

Of the 9,000 acres that are currently in private ownership, 620 acres are currently registered in either the Managed Forest Law (MFL) Program or the Forest Crop Law (FCL) Program. Six hundred and nineteen (619) acres of this land is registered as open to the public and one acre is registered as closed. The majority of the private lands in the existing property boundary are wooded residential properties. There is a small percentage of lands that are in agricultural use, primarily for growing hay or being used as grazing land. Most of these properties are small farms located in the area north of HWY 2.

Out of the 1,000 acres in the Gordon Unit, the majority of the land is used for forest production. A large proportion of the property is leased to the Department of Corrections. A small portion of this area is developed as a correctional facility.

Current Ownership of Lands within the Boundary Expansion Areas

In the original proposed Master Plan (August 2002), the Department proposed expanding the current BRSF project boundary an additional 45,000 acres. However, due to public opposition the Department adjusted the proposed expansion to: eliminate the Western Boundary Expansion Area near Blueberry Creek (1,000 acres); modify the Southern Boundary Expansion Area to exclude 1,600 acres of mostly residential parcels; and reduce the Northern Boundary Expansion Area by 10,000 acres with the Department mainly focusing on acquiring large tracts of industrial forestlands. In the approved Master Plan the total Expansion Areas, approximately 32,000 acres, are currently in private ownership: 7,000 acres in the Northern Boundary Expansion Area and 25,000 acres in the Southern Boundary Expansion Area.

Current Land Use/Land Cover on Lands within the Boundary Expansion Areas

Out of the 32,000 acres included in the property boundary expansion, approximately 88% are currently industrial forestlands, 9% are wetland and 2% are private, non-industrial forestlands. The majority of the current residential land cover is undeveloped and wooded.

Northern Property Boundary Expansion Area
In the Northern Property Boundary Expansion Area, approximately 79% (5,537 acres) of the 7,000 acres are currently undeveloped industrial forest, with much of that land contiguous to the existing BRSF lands. Approximately 1% (80 acres) is currently forested, private land used mostly for hunting. Most, if not all, of the lands in the Northern Boundary Expansion Area are undeveloped, with minimal site improvements or structures. In 2002, 5,617 acres in the Northern Property Boundary Expansion Area are either registered in the Managed Forest Law (MFL) Program or the Forest Crop Law (FCL) Program. All of these acres are registered as open to the public.

Southern Property Boundary Expansion Area
In the Southern Property Boundary Expansion Area, approximately 90% (22,477 acres) of this area are currently in large blocks of undeveloped industrial forestland. The remaining acres are currently in private forestlands used mostly for hunting. Most parcels are undeveloped, but some have site improvements and structures. Currently 22,877 acres in the Southern Property Boundary Expansion Area are either registered in the public Managed Forest Law (MFL) Program or Forest Crop Law (FCL) Program. A majority of these lands are open to the public for hunting and fishing.

Current Zoning

In 2002 the zoning was based on the existing Douglas County Zoning Map (the new Land Use Plan map for Douglas County is expected to be adopted in January 2003). Out of the total Property Boundary Expansion Areas, approximately 32,000 acres in size, a majority of the acres are currently zoned as Forestry; few acres are zoned as Residential/Recreation.

Change in Land Ownership from Private to State

About 9,000 of the 50,000 acres within BRSF boundary are privately owned.
Land ownership within the current forest boundary would change slowly with continued state acquisition of land from willing property sellers within the current forest boundary. An estimated 900 to 1,800 acres may be purchased over the next 15 years.

All new impacts to land ownership and land use would result from the Real Estate section described in Chapter Two. It proposes to expand the current property boundary to include the Northern and Southern Boundary Expansion areas. The Real Estate section proposed adding approximately 32,000 acres to the state forest (Refer to the land Classification map in the Maps Section at the back of this Document). Approval of the boundary expansion authorizes the

Department to purchase land within the expanded boundary as it becomes available from willing sellers. While there is the potential for some large purchases, acquisition would likely proceed over a long time period, and it is unknown when and how many parcels may become available.

State purchase of lands in the expansion area would have only modest impact on the general land use in the local area. Industrial forest companies own about 88 percent of the total expansion area. Under state ownership, the industrial forestlands would continue to produce timber products and other forest values, but would be managed less intensively. Of the remainder that is not industrial forest, most of these lands are undeveloped, some have site improvements and structures. With state acquisition, the wetlands would remain unchanged. The recreational/rural residential lands, being primary wooded, would remain unchanged, except for the removal of structures and the restoration of the site back to a natural condition. It is DNR policy to avoid purchasing land with existing structures whenever possible.

The Northern Boundary Expansion Area is approximately 7,000 acres, with 79% being industrial forest. The Southern Boundary Expansion Area covers about 25,000 acres, the majority, 90%, is industrial forest. The number of acres of MFL or FCL lands in each of the expansion areas are shown in the Table below.

Table: *Lands enrolled in the Managed Forest Law (MFL) or Forest Crop Law (FCL) Program in the Boundary Expansion Areas.*

Project Area	BRSF boundary	Northern Expansion	Southern Expansion
Total Project Acres	51,417	7,000	25,000
Acres of MFL & FCL Open	619	5,537	22,477
Acres of MFL & FCL Closed	1	0	0
Total Acres	620	5,537	22,477
Percent of MFL & FCL Total	1	79	90

State acquisition of the lands in the expansion areas would have a minimal impact on the current land use in the region. Based on the current land use in forests and other natural habitats, the land use under state ownership is not expected to change significantly. This would be a negligible shift in the region's land use.

FISCAL IMPACTS TO STATE COSTS AND REVENUES

Facility Improvement Costs for Lands within the Current Property Boundary

Costs associated with improvements in Chapter Two - The Master Plan are summarized in the following Table.

Facility Improvement Costs	
Improvements:	**Projected Cost**
Area 1- Lake Superior Clay Plain- Native Community Management Area	
Establish a new "hunter walking trail" located south of HWY 13 and East of the river.	$5,000
Area 4- Brule River – Scenic Management Area	
Improve the facilities at the 10 existing landings to address resource damage and user conflict issues.	$2,000
Provide additional Rangers or Naturalists as landing hosts to help orient paddlers	Operational Cost
Monitor and manage recreational use to assure compatibility with the natural resources and recreational facilities.	Operational Cost
Provide additional day use scenic viewing areas.	$10,000
Construct interpretive wayside exhibits at each of the authorized canoe landings	$176,000
Provide additional drinking water wells and pit toilets at the most popular landings.	$75,000
Replace the existing toilets at Highway 13	$15,000
All landings would be posted as quiet zones and will be monitored.	Operational Cost
Construct a new well at the picnic area at the mouth of the Brule	$6,000
Angler Trails- install erosion control measures like waterbars and steps; labor would be provided by WCC or DNR work crews.	Operational Cost
Signs installed at each of the 18 angler parking lots that will include a property map, the general rules, and a graphic identification of the fish species.	$5,000
Construct an 8 car parking lot by CTH H and a trail to the Waino Rock overlook.	$11,000
Remove downed and fallen trees in the river only if deemed a safety hazard.	Operational Cost
The Copper Range Campground	
Remove the boulders and posts, add plantings and pad maintenance.	$5,200
Eliminating 3-5 campsites and develop 3 walk-in sites	$1,500
Convert one of the eliminated sites a small parking area.	$500
Install a pressurized water system	$5,000
Install toilets	$5,000
Table continued on next page	

Facility Improvement Costs (continued)	
Improvements:	**Projected Cost**
Bois Brule Campground	
Revise the campground layout to provide 18-23 rustic campsites with increased vegetation screening and space between campsites.	$6,900
Improve the water supply facilities.	$5,000
Construct a group camp facility north of the current Bois Brule Campground with 4 distinct sites, each capable of accommodating 20 people; a central parking area for 20 cars, a pit toilet and a pressurized water supply connected to the well in the Bois Brule Campground.	$150,000 Included above
Install electrical hookups for campground host site and to operate a pressurized water supply.	$8,000
The Stony Hill Nature Trail	
Re-label trail with the interpretive theme of the unique cultural history of the Brule River Valley, including the CCCs. Link will connect the campgrounds with the fish hatchery, the headquarters, Afterhours Trail System, the North Country Trail, and the group campground.	$10,000
Area 5- Brule River Bog and Spillway - Native Community Management Area (SNA)	
Close the primitive roads to motorized use and periodically mow.	Operational Cost
St. Croix Day Use and Boat Launch Area.	
Improve the facilities of the St. Croix day use and boat launch area with round wood picnic tables and benches, round wooden signposts, and routed signs.	$1,500
Add vegetation to screen the picnic area and to provide shade	Operational Cost
Install a boat launching / fishing pier, approximately 50 feet in length.	done already
Relocate the historic marker to the picnic area	$1,200
Install an attractive wellhead and construct a rustic, CCC style shelter at the artesian well.	$25,000
Area 6- Afterhours - Recreation Management Area	
Improve trail conditions and facilities and maintain the rustic character.	Operational Cost
Construct a rustic style warming shelter	$5,000
Construct a pit toilet along the trail.	$15,000
Area 7 Administrative - Special Management Area	
Develop additional educational and customer services improvements in association with the existing building complex.	$25,000
Construct a rustic log shelter approximately 24’ by 36’ in size, with walls that can be screened in summer and enclosed in winter.	$100,000
Table continued on next page	

Facility Improvement Costs (continued)	
Improvements:	**Projected Cost**
Area 8- Troy Pit Pines – Forest Production Area	
Trail development (Devils Hole Ski Trail)	$25,000
• parking lot and roads	$20,000
• warming shelter	$250,000
• shop facility	$130,000
• drain field and well	$20,000
Provide access to the existing North Country National Scenic Trail.	No cost, volunteers
Area 8 - Rush Lake:	
Make minor improvements to protect the shoreline from erosion and fire.	Operational Cost
Provide a campfire ring and a picnic table.	$200
Area 10- Pine Forest and Barrens - Native Community Management Area	
Add a loop trail and Brule Bog scenic overlook to the existing snowmobile trail. and winter ATV trail. Re-route the trail to as needed to improve the safety	$500
Area 13- Lake Minnesuing - Scenic Management Area	
The existing forest trails would be maintained through periodic mowing.	Operational Cost
TOTAL ESTIMATED FACILITY IMPROVEMENT COSTS*:	**$1,130,500**

*Costs are estimated in 2002 dollars, and are intended for planning purposes only.

BRSF Operation Costs and Staffing Estimates

The current permanent staffing on the stat forest includes a superintendent, a forester and a ranger. This level of staffing has not changed since the 1950s. In addition, limited term employees (LTEs) and contract staff are used to address additional work loads. The current operational costs are as follows:

Salaries and fringe: $185,000
LTEs: $55,000
Supplies and Services: $90,000
TOTAL: $330,000

About $20,000 of this money goes to support the total forestry operations by funding operations of the Brule office which also supports other Department functions.

Financial Impact
Full implementation of this plan will require additional financial resources. The current permanent forest staffing is the same as it was in 1952. To appropriately manage the resources and visitors of the state forest will require additional staff.

A Natural Resources Educator would be provided to educate the public on the implementation of this plan and the ecological principals behind the prescriptions. They would also develop the program of developing user ethics on the river. A Forester would focus on restoration practices on the boreal forest and pine barrens and also provide land control and research support. An additional Ranger would provide visitor protection and service and meet the demands of protecting the resources from increasing numbers of visitors. Additional support staff would be needed to provide expanded service on evenings and weekends to support the campgrounds. They would also provide maintenance to care for the improved facilities such as the restrooms at watercraft landings and the ski trails.

Estimates		
Natural Resources Educator	Salary and Fringe	$50,000
	Support costs	$10,000
		$60,000
Forester	Salary and Fringe	$50,000
	Support costs	$10,000
		$60,000
Ranger	Salary and Fringe	$45,000
	Support costs	$10,000
		$55,000
LTE Support	Salary and Fringe	$25,000
	Support costs	$10,000
		$35,000
	Total Estimated Cost	**$210,000**

Impacts to State Forest Revenue

Timber

The financial impacts of the master plan to timber sale revenue are difficult to predict. External market forces are likely to have a greater impact to the change in revenue than the prescriptions in the master plan. However, some general comments can be made.

Pine sale revenues (adjusted for inflation) are not likely to change significantly in the next 50 years based on the management prescriptions. Timber is sold as part of the state's forest management goals but not as a specific product such as pulp or sawlog. The market conditions at the time of the sale determine the valuable use of the wood. Planting a blend of pine species will

likely reduce long term (100 years) revenue because there will be fewer marketable trees in the stands. This effect will likely be offset by the growth in volume and product value.

Aspen sale revenue may show a decrease in the next 50 years because the management prescriptions will result in more difficult and less cost effective harvest operations. This type of a sale is harder to perform and will generate reduced stumpage prices. Revenue from sales in the Miller Road / CCC Square Road Habitat Area will remain stable.

Sales performed under the previous master plan to mitigate fire, insect, and disease concerns following the severe hail storm in 2000 will negatively impact revenue flow until approximately 2025 when these stands will begin to need thinning. This disaster likely cost the state tens of millions of dollars in lost revenue potential.

Overall, considering the mix of pine and hardwood timber sales on the property, annual timber revenue will likely remain at $300,000-$400,000 in 2002 dollars.

Recreation

Recreation revenue is a minor source of revenue on the property, roughly 10% of the timber revenue. Recreation revenue is relatively stable and only one significant revenue producing recreation facility is in the master plan. However, fee increases directed by legislation will increase recreation revenue.

Changes in the operation of the campgrounds, eliminating individual campsites and opening a group campground, are not expected to have any material effect on camping revenue.

The Troy Pit Pines cross-country ski trail is expected to be regional recreation destination. Annual visitation may exceed 25,000 skiers. Trail pass sales, combined with the pass sales at the Afterhours Ski Trail, may be expected to increase from about $12,000 a year (2002) ultimately to approximately $25,000 in 2020. Ski Trail revenue is difficult to predict because of variability in regional snow conditions but generally the Brule area receives snow more dependably than many of the other regional providers of cross-country skiing.

Land Acquisition Costs for the Boundary Expansion

The master plan places a priority on the acquisition of large tracts of undeveloped lands, parcels with water frontage, and parcels for future state forest recreation sites. On some properties, the Department may purchase only scenic or management easements rather than acquiring all the land rights. Acquisition may be accomplished in a variety of ways, including; fee purchase, exchange, donation or through the purchase or donation of conservation easements. Department policy is to only seek to property purchases from willing sellers. All transactions are based on the "fair market value" at the time of purchase. The fair market value of a particular property would be established through an appraisal process that factors in variables, such as, any property improvements, whether it has lake or river frontage, the topography, the soils, the existing vegetation / timber value, adjacent land uses, etc.

Despite the priorities listed above, acquisition is often driven by opportunity. When parcels may become available, or how much may be available in any given year, is unknown. Therefore, annual acquisition costs can not be estimated with any degree accuracy. Acquisition will likely be a long, slow process. Reasonably, less than one half of the land within the property boundary expansion areas would become available for purchase over the next 50 years.

For planning purposes only, the acquisition cost of an acre of land, based on recent appraisals of undeveloped forest land in northwestern Douglas County, would be approximately $800/acre (Bade 2002). This amount is in 2002 dollars and assumes that the land does not have structures or other improvements. The fair market value of properties would be determined by an independent appraiser and would consider comparable sales, current use, proximity to water, topography, soils, access and other factors. Therefore, a ballpark estimate of average land cost per acre is difficult to determine and fair market values would vary substantially according to the individual characteristics of each property.

Therefore, the estimated total cost to acquire the 32,000 acres, to be added to the current property boundary, would be in approximately $25.6 million dollars.

FISCAL IMPACTS TO LOCAL GOVERNMENTS AND TAXPAYERS

Impacts to Local Government Tax Revenues

There would be no significant change from current revenues as a result of Department land acquisition within the current expanded state forest boundary. Any reduction in tax revenues to local governments would be offset due to the Wisconsin state law that provides for payments from the Department of Natural Resources to fully replace or exceed the property taxes that would have been collected if the land was not acquired by the DNR. (Refer to the Land Acquisition Fact Sheet in the Appendix for additional information.) Lands acquired by the state would not require educational, law enforcement, emergency or other services and facilities such as roads, etc. that are typically provided at the expense of local governments if those lands were privately developed. The resulting fiscal impacts to local governments would be a saving of the cost of providing these services. Often the cost of additional services exceeds the additional tax revenue received.

Tax Revenues to Local Governments and School Districts

Taxpayers and local governmental officials sometimes oppose public land acquisitions because the lands are removed from the tax rolls. Although they are removed from the tax rolls, the Department makes payments in lieu of taxes to offset tax losses. Presently, the state makes a payment in lieu of taxes to each taxation district in an amount equivalent to the property taxes. Under the payments in lieu of tax programs, acquisition of lands for the state does not increase the local taxes.

Some privately owned parcels may be acquired by the Department of Natural Resources (DNR) through purchases, donations or through the purchase of development rights or scenic easements. In these cases, any reduction in tax revenues to local governments would be offset by the Wisconsin State Law that provides for payments from the DNR. The law requires that the payments fully replace or exceed the property taxes that would have been collected if the land was not acquired by the DNR.

For all lands acquired on or after January 1, 1992, the state makes a payment in lieu of taxes to each taxation district in an amount equivalent to the property taxes. The only difference between this program and private land taxation is the relation to the assessed value. The initial assessment value of Department lands is set at the Department purchase price of the land based on the fair market value. Subsequently this value is adjusted to reflect the change in assessed value in the taxation district. The first year payment is actually based on an adjusted purchase price. All other aspects of the way the DNR pays this aid in lieu of taxes under this program is the same as those for a local taxpayer. Under the payments in lieu of taxes program, it is clear that the acquisition of land for the state does not increase local taxes. Concerns over state owned properties should focus on impacts to the environment, local economy, recreational opportunities and other important

issues. For more information of this subject please refer to the Land Acquisition sheet in the Appendix.

Impacts to Local Roads and Highways

No significant impact to town, county or state highways would result from the management actions master plan. No new forest roads are to be constructed. Road and highway use by trucks and other equipment, related to timber harvesting, would remain generally equal to or slightly less than current levels. The only recreational development in the Master Plan that may result in a noticeable increase in local traffic and roadway impacts is the new Devils Hole Trail System. The trail system would be developed off of Samples Road about one and one-half miles from the intersection of Troy Pit Road and HWY 27. Improvements would include a 100-car parking lot, a single trail that would serve as a cross-country ski trial in the winter. The construction of this trail facility would result in an increase in the number of vehicles using Samples Road and HWY 27. The increase is difficult to predict, however it is estimated that the visitation would be approximately 25,000 per year. Assuming two visitors per car, the traffic volume would be estimated at an average of 34 vehicles per day. This would be in an addition to the number of vehicles using the road for other purposes. The increased traffic would result in some increase amount of road wear and maintenance required.

There would be no noticeable short-term change in the type or level of highway use as a result of state purchase and management of lands in the boundary expansion areas. Generally, under state management the level of forest management activity is projected to be less than that of industrial forest managers and some private landowners. No significant changes in traffic from recreational users are expected since these lands would primarily be used for activities like hunting, hiking and berry picking. The majority of these lands are now open for these public uses.

State land purchases in the expansion area may have a positive impact on highways and traffic levels as maintaining these lands in undeveloped public lands would create a lower demand on local roadways than if the lands were subdivided into smaller private parcels and developed.

Impacts to Local Law Enforcement and Other Emergency Services

No significant impact to local law enforcement or emergency services would result from the management actions. The general number of visitors to BRSF is expected to increase only slightly in keeping with current trends. The Master Plan plans to provide additional State Forest Law enforcement and rescue personnel for forest visitors.

The proposed development of a canoe landing at CTH FF was expected to provide a shorter and safer paddle for novice level canoeists. In turn, this would be expected to reduce the demands on emergency water rescue services. However, as a result of public opposition, the landing was deleted in the final master plan that was presented and approved by the Natural Resources Board in December 2002.

Over the long-term, state land acquisition in the boundary expansion areas would reduce the potential future development of the area and the accompanying demand for fire, EMT and law enforcement services.

OTHER SOCIO-ECONOMIC IMPACTS

Economic Impacts

The Brule River State Forest contributes to the local and regional economy primarily in the areas of tourism and forest product generation. Within a 12 county economic region of northwest Wisconsin, the wood product economic sector ranked third and the tourism sectors ranked seventh for industry output to the regional economy (Marcouiller and Mace 1999). The forest resources are important to supporting wood product generation and tourism in this region and are largely compatible uses. The contribution of the BRSF to this 12 county regional economy in the areas of forest products and tourism is small but mirrors the regional experience in producing these economic products in a manner that is compatible between the two.

Economic science cannot be accurately used to measure impacts at the scale of the local communities around the BRSF. However, a number of local businesses clearly benefit from the management of the state forest. The recreational opportunities offered on the forest attract users that use local lodging, restaurants, outfitters and other businesses. The timber harvest opportunities on the BRSF provide resources for local logging companies and associated businesses, such as mills and lumber truck companies.

The management plan should continue to provide levels of timber harvest over the next 50 years similar to that of the last 20 years. However, the type of forest products may change because of the changes in the forest management goals. After 50 years, the forest composition and age is expected to changes so the type of timber harvested will likely shift toward more conifers and birch and away from aspen. The ultimate use of this wood, will be determined by the market conditions at the time the harvests are scheduled.

Local tourism and tourism related retail businesses would see a slightly positive long-term benefit as the result of changes in the master plan. In the next few years, the existing recreational opportunities will be maintained at similar levels. The addition of another cross-country ski trail and a new mountain bike train should result in a slight increase in visitors to the local communities.

Within the boundary expansion area ownership of the land would gradually change as described in Impacts to Land Ownership and Land Use in this chapter. Approximately 32,000 acres are now managed as industrial forests producing primarily aspen and red pine timber. Some of the non-industrial private forestlands within the expansion area are currently managed for forest products while most are owned as recreational land. Under state management, with a long term management focus, would shift toward management for a variety of natural communities. However, the degree and type of timber harvested will depend on the condition of the forest at the time of acquisition and the ecological capability of the site. The addition of 32,000 acres to the state forest would have a positive long-term impact on regional tourism as it would permanently maintain and increase the amount of public land open for hunting, hiking and other traditional recreational uses.

Impacts to Agriculture

In the draft master plan approximately 4,000 acres in the Northern Boundary Expansion Area were agricultural lands. In the master plan presented to the Natural Resource Board in December 2002, the boundary expansion areas had been reduced. In the approved Master Plan, the expansion areas contain no agricultural areas. Therefore, there are no impacts to agricultural lands.

The Northwest Regional Planning Commission has identified some of these lands as "Prime" agricultural lands. However, according to the Douglas County Planning Administrator (Moore 2001), the designation of these lands a "prime" implies only that they are suitable as grazing lands, and are not considered as suitable for cultivation due to the heavy clay soil. This is further supported by the U.S. Department of Agriculture, Soils Conservation Service, who describes the "red clayey soils" located near Lake Superior as having low agricultural suitability, and "greater than 50% are poorly or very poorly drained soils". This would explain the regional trend of less agricultural lands in this area being actively farmed.

The long-term agricultural trend in the 12 county northwest Wisconsin region is a steady decline in agricultural land use. According to the Wisconsin Agricultural Statistics Service, in the years between 1974 and 1996, an average of 42,000 acres per county has gone out of production (a rate of approximately 1,900 acres per year) (Bartelt et al. 1999). Agricultural land is gradually being converted to recreational, rural residential, and hobby-farm use.

Impacts to Energy Consumption

The master plan would not generate a significant increase in energy consumption.
There would be no change in fuel use by staff or contractors since the overall level of management activity called for in the plan is at or below current levels. The plan maintains the existing recreation facilities and conditions and does not create any major new draw for recreational use. Development of the ski trails may cause a small increase in fuel use by skiers and bikers drawn to the new facility, primarily from northern Wisconsin. The majority of additional users of the new ski trail are expected to be from the local area or region. The increase in fuel consumption would not be significant.

Impacts on Resources of Special Tribal Interest

At the beginning of the BRSF master plan, a process was developed to consult, on matters affecting off-reservation treaty rights, on a government-to-government level with designated representatives from the Great Lakes Indian Fish and Wildlife Commission (GLIFWC). These representatives in-turn reported to, and received direction from, the Voigt Intertribal Taskforce Members. These consultations were arranged as "round-table" meetings that were held at various

key phases in the development of the Draft BRSF Master Plan. At each phase, representatives from GLIFWC and any other interested tribal members were invited to comment. Several of these round-table meetings focused on identifying potential impacts to resources, included under the Chippewa off-reservation treaty hunting, fishing and gathering rights. These resources will be referred to as "resources of special interest to the tribes."

During and following these consultations, GLIFWC representatives identified the following resources as being "resources of special interest to the tribes." It was stated that the tribes reserve the right to add to or amend this list. It was the understanding of the DNR staff that participated in the consultations, that the communities indicated are of special interest to the tribe because they provide particularly important habitat for game species hunted or trapped by tribal members, or contain particularly important plants and other forest products gathered by tribal members (Meeker 1993).

It is important to note that only a portion of the management decisions affection these resources occur in the BRSF in the master planning process. The process through which hunting and fishing regulations are determined, occurs separately from the master planning process.

Wildlife Species of Special Tribal Interest

English Names	Ojibwa Names
Deer	Waawaashkeshi
Ducks	Zhiishiibag
Geese	Nika
Bear	Makwa
Turkey	Mizise
Beaver	Amik
Otter	Nigig
Fisher	Ojiig
Bobcat	Gidagaa-bizhiw
Trout	Nmegos
Salmon	unknown

Plants and Other Forest Products of Special Tribal Interest

English Names	Ojibwa Names
Wild Rice	Manoomin
Paper birch bark	Wigwas
Berries	
Strawberries	Ode'imin
Red Raspberries	Miskominagaawanzh (plant), miskwimin (berry)
Blueberries	Miin'an
Cranberries	Aniibimin
Firewood	Mishi
Balsam fir (bows)	Zhingobaandag,oog
Ceremonial plants	Mashkiki

Forest Communities (Curtis 1971, Epstein et al. 1999)

Northern Swamp – Conifer and Hardwoods Sites:

- Brule Spillway (David Swamp, Blue Springs, McDougal Springs, Cedar Island, Winneboujou)
- Lower Brule Boreal Forest(Trask Creek, Weir Riffles) Afterhours Tamaracks

Northern Mesic Hardwood Forest Sites:

- Sugar Camp Hill, Lake Minnesuing Hemlock Hardwoods

Boreal Forest Sites:

- Lower Brule Boreal Forest (McNeil's Landing, Trask Creek, Weir Riffles, Bracket's Corner, Pearson Creek)
- CCC Miller Boreal Forest and Pines

Northern Dry-Mesic Forest Sites: (with red and white pine dominants)

- Brule Spillway (Blue Springs, McDougal Springs, Cedar Island, Winneboujou, Stoney Chimney Cedars)
- Vapa Road Pines
- Willard Pines
- Lenroot Ledges
- Buried Road Pines

Northern Dry (Xeric) Forest Sites:

- North Country Trail Barrens
- Devils Hole Red Pines

Savanna Communities (Curtis 1971, Epstein et al. 1999)

Pine Barren Sites:

- North Country Trail Barrens
- Jerseth Creek

Shrub Communities (Curtis 1971, Epstein et al. 1999)

Alder Thicket Sites:

- Brule Spillway (scattered sites)
- Brule Boreal Forest (scattered sites)

Open Bog Sites:

- Hoodoo Lake
- Gordon Correctional Bog

Herbaceous Communities (Curtis 1971, Epstein et al. 1999)

Emergent Aquatic Sites:

- Lower Brule Boreal Forest (Brule River Marsh and Lagoon)
- Brule Spillway (Cedar Island, Winneboujou [Big Lake})

Submergent Aquatic Sites:

- Lower Brule Boreal Forest(Brule River Marsh and Lagoon)
- Brule Spillway (Cedar Island, Winneboujou [Big Lake})

This evaluation of the Master Plan's impact on resources of special tribal interest is organized according to the four "ecological landscapes" that have been used throughout the master planning process. These are; the Lake Superior Clay Plain, the Brule River Ecosystem, the Bayfield Sand Plain and the Mille Lacs Uplands. Refer to Chapter Two - The Master Plan and Chapter Five - Supporting and Background Information, for a full description of the physical, ecological and recreational resources in each of these ecological landscapes.

The following section evaluates the "reasonably foreseeable" impacts to "resources of special tribal interest." Refer to Chapter Two for detailed description of the management for Management Area 1 through 13, and Chapter Three for an evaluation of impacts to physical and biological resources. The evaluation of impacts to resources of tribal interest is organized according to Property-Wide Provisions, the Boundary Expansion Areas, and the four ecological landscapes.

Property-Wide Management Provisions

Most of the Property-Wide Management Provisions propose to continue current management practices. However, the following provisions have been added to the master plan in order to reduce (mitigate) or avoid adverse impacts including those to "resources of special interest to the tribes."

Herbicide Use

- The public and tribes will be informed as to the areas where herbicide will be applied, in the BRSF annual meeting and literature. This literature will be provided to a designated Tribal representative and additional information will be provided upon request.

Invasive, non-native Species Control

- Removal of Scotch pine, Norway spruce and European larch would occur over time. If detected on state owned lands in the Brule Rive State Forest, invasive exotic plants such as common and glossy buckthorn and purple loosestrife would be controlled. Other invasive exotics, if detected, such as spotted knapweed and zebra mussels would be dealt with if appropriate and effective methods are available.

In the tribal consultations, tribal members and their representatives have expressed their interest in the issue of motorized access into the state forest property in order to exercise their off-reservation treaty rights. Refer to Chapter Two - Property-Wide Management Provisions for a description of the existing policy regarding use of State Forest roads.

The policy regarding the use of state forest roads, above is a continuation of a long-standing or "historic" aspect of the forest's management, and therefore does not result in a primary or secondary impact to "resources of special tribal interest."

Boundary Expansion Areas

Impacts to "resources of special interest to the tribes" as the result of the gradual acquisition of property in the area identified in the Northern and Southern Boundary Expansion Areas would be

positive. Since any lands acquired would become part of the BRSF, they would also be added to the lands that are available to the tribes to exercise the Chippewa off-reservation treaty hunting, fishing and gathering rights. Ultimately, as all of the lands in these areas were acquired, approximately 32,000 acres of land would be added to the forest. This would substantially increase the area and resources available to the tribes to exercise their Chippewa off-reservation treaty hunting, fishing and gathering rights. As described in Chapter Two, in the section titled the Real Estate Management, the acquisition of the lands in the boundary expansion areas would occur very gradually over many years. Refer to this section for additional information about the Boundary Expansion Areas.

The Lake Superior Clay Plain
Subsection 212Ja (National Hierarchical Framework of Ecological Units)

The Lake Superior Clay Plain includes the following Land Management Areas:

Area 1- The Lake Superior Clay Plain – Native Community Management Area
(contains the Brule River Boreal Forest and Bear Beach State Natural Area)
Area 2- The Sugar Camp Hill / Lenroot Ledges - Native Community Management Area
Area 3- The Miller Road / CCC Square- Habitat Management Area

The following section describes the changes in management for Areas 1, 2 and 3 and any resulting "reasonably foreseeable" impacts to "resources of special tribal interest":

- The management for Areas 1, and 2 in the Lake Superior Clay Plain would place new emphasis on the restoration of the native "boreal" type forest through active and passive management techniques. This would very gradually, over a period of 50-100 years, shift the upland forest cover from early successional, aspen-dominated forests to a later successional, more "boreal" type of conifer-dominated forest. The Brule Boreal Forest State Natural Area and Pearson Creek portion of the Bear Beach State Natural Area would be passively managed as reference sites. Impacts to medicinal and ceremonial plants would be expected to generally be positive, In that a later successional forest would more closely resemble the historic conditions when the plants were traditionally gathered. Less early successional habitat would be available for the wildlife species that prefer that habitat type. Such species that prefer early successional habitats are: deer, bear, ruffed grouse, bobcat and beaver. Gradually, over a 50-100 years, less of this type of habitat would be available for the animals on the BRSF. One exception would be the fisher, which may benefit from an older forest habitat with more woody debris. The number of balsam fir trees would be expected to gradually increase with the overall increase in conifers in these areas, making balsam fir bows more available.

- The management for Area 3 would maintain it in an early successional stage of a clay plain boreal forest. This would continue to provide habitat for wildlife that prefer this type of habitat, such as deer, bear ruffed grouse, bobcat and beaver. Less balsam fir would be available in this area.

- Any existing red pine plantations would be thinned create a more natural appearance and allowing more light to reach the understory plants. This would generally improve the diversity of the understory plant species in these stands, and may increase the number of species of understory plants used for medicinal and ceremonial purposes.

- The elimination of field drains and the reestablishment of more natural drainage patterns of storm water runoff and infiltration. This would be expected to reduce the volume of storm runoff and sediment that flows into the Bois Brule River and its tributaries during periods of peak flow. This would be of general benefit to fish and other aquatic species of interest.

- The management in the Lake Superior Clay Plain would continue, but reduce the total number of acres per year where clearcuts are performed. The reduction in the number of acres clearcut would provide less of this habitat for the species of interest that prefer openings and require natural disturbance patterns, such as aspen and grasslands, deer and grouse. Inversely, the reduction in the number of acres clearcut would generally provide more undisturbed closed canopy forest habitat for species of interest that prefer this, such as fisher, balsam fir and other medicinal and ceremonial plants.

- The existing wetland impoundments would be maintained and expanded to provide wetland wildlife habitat for species interest such as ducks, geese and other waterfowl. The Master Plan to plant a portion of these areas with wild rice, but this is not expected to reach harvestable levels.

The Brule River Ecosystem

The Brule River Ecosystem includes the following Land Management Areas:

Area 4- Brule River – Scenic Management Area

Area 5- Brule River Bog and Spillway - Native Community Management Area
(contains the Brule Glacial Spillway State Natural Area)

The following section describes the changes in management for Areas 4 and 5 and any resulting, "reasonably foreseeable" impacts to "resources of special tribal interest":

- The management of the "Eastern Boarder Forest" area would gradually shift the forest cover over a period of 50-100 years, toward and older more conifer dominant forest. Impacts to resources of tribal interest would be similar to those described for Area 1 and 2 and would occur over an equally gradual period.

- Naturally downed or fallen trees in the river would be left in the river to provide important fish habitat, unless they are deemed a hazard to safe navigation. This would improve the aquatic habitat in general and for the fish species of "special tribal interest".

- The Master Plan will continue the current management of the upper Brule River by not harvesting timber within the bog area, and thinning the existing pine plantations on the upland ridges. These areas would be thinned in stages to create a more natural appearance and encourage a more diverse understory. There would be some minor disturbance to the areas used for access and in the areas being thinned. Any impacts to "resources of special tribal interest" in the Bog would be mitigated by planning the harvesting access route to the pine plantation to avoid any sensitive vegetation, wildlife or endangered resources. Any impacts to "resources of special tribal interest" would be further mitigated by performing harvesting operations only during the winter months when the ground is frozen.

The following management actions for Areas 4 and 5 would not directly impact "resources of special tribal interest", but would serve as important tools to maintaining the health and quality of the "resources of special tribal interest".

- The water quality of the Bois Brule River would continue to be monitored by monitoring the aquatic invertebrates that serve and indicators of water quality.
- The numbers of river users, patterns of use, and any evidence of the degradation of the river's ecological or physical quality would be monitored.
- A program of public education on the preservation of the river's natural resources and river etiquette would be implemented.

The Brule Glacial Spillway State Natural Area will be managed as described in the Brule River State Forest State Natural Area section in the Appendix, and does not result in any known impacts to " resources of special tribal interest." All other management for Area 4 and 5 would continue the current management practices and, therefore, would not result in impacts to the "resources of special tribal interest".

The Bayfield Sand Plain
Subsection 212Ka (National Hierarchical Framework of Ecological Units)

The Bayfield Sand Plain ecological landscape includes the following land management areas:

Area 6 - Afterhours - Recreation Management Area
Area 7 - Administrative - Special Management Area
Area 8 - Troy Pit Pines – Forest Production Area
(contains the Rush Lake Interior Beach State Natural Area)
Area 9 - Hazel Prairie Pines – Forest Production Area
Area 10 - Pine Forest and Barrens - Native Community Management Area
(contains the Mott's Ravine State Natural Area)
Area 11- Gordon Annex - Forest Production Area

The following section describes the changes in management for Areas 6 through 11 and any resulting "reasonably foreseeable" impacts to "resources of special tribal interest":

- Several recreational facilities are for Areas 6 through 11. They include the construction of: a small warming hut, a shelter for educational programs, several pit toilets, connecting trails, a 200-yard extension to the existing snowmobile and winter ATV trail, a 20-25 mile cross-country skiing; which includes a 100-car parking lot, a rustic warming shelter and a maintenance shed. Refer to Chapter Two for a detailed description of these improvements and Chapter Three for an evaluation of impacts to the physical and biological resources.

- The management of Areas 8, 9 and 11, which are designated as forest production areas, would continue the current management to provide wildlife habitat, ecological benefits, and a steady supply of renewable forest products. This would include the maintenance of primarily pine covertypes (red pine, white pine and jack pine) in different age classes along with some aspen, northern hardwoods and areas of grass and upland brush. The gradual shift in the forest composition, over a 50-100 year period, toward a minor increase in the percentage of jack pine cover, and a slight decrease the percentage of red pine cover would result in minimal impacts to "resources of special tribal interest".

- Management Area 8 is to be managed as a Forest Production Area. However, it contains the Rush Lake Interior Beach State Natural Area. The State Natural Area consists of the 22-acre Rush Lake and its shoreline to the ordinary high water mark. The location and management of this area is described in the Brule State Natural Area State Natural Area Section in the Appendix and the Brule River State Forest State Natural Area map. No known impacts to "resources of special tribal interest" would occur in the Rush Lake Interior Beach State Natural Area.

- All other management for Areas 8, 9 and 11 would continue the current management practices and, therefore, would not result in any significant impacts to the "resources of special tribal interest".

- The Master Plan proposes to designate Area 10 as a Native Community Management Area (containing the Mott's Ravine State Natural Area). Consequently, the Native Community Management Area would be managed "to restore a mosaic of native vegetative communities that provide a range of conditions from open barrens to dry pine forest types." Management would shift the existing vegetative cover to increase the jack pine, grass and shrub components. Restoration and regeneration techniques would include regeneration harvests, prescribed fire, soil scarification, natural regeneration and planting. These management actions would be a continuation of the current resource management of the Bayfield Sand Plain. The gradual shift the forest composition, over a period of 50-100 years, toward a minor increase in the percentage of jack pine cover, and a decrease the percentage of oak and aspen cover would gradually result in a minor benefit to the plant and wildlife species of special tribal interest that prefer or require these types of cover. Inversely, plant and wildlife species of interest that prefer or require a habitat with more oak and aspen cover would gradually be adversely impacted.

- The 600 acre Mott's Ravine State Natural Area would be established and managed to restore the barrens / dry pine community by maintaining the existing natural community remnants and expanding them wherever feasible in conjunction with the adjacent land included in the southern boundary expansion area.

- All other management for Area 10 would continue the current management practices including the gradual thinning of existing pine plantations and therefore would not impact to "resources of special tribal interest."

The Mille Lacs Uplands
Subsection 212Kb (National Hierarchical Framework of Ecological Units)

The Mille Lacs Uplands ecological landscape includes the following land management areas:
Area 12- Willard Road - Native Community Management Area
Area 13- Lake Minnesuing - Scenic Management Area

The following section describes the changes in management for Areas 12, and 13 and any resulting, "reasonably foreseeable" impacts to "resources of special tribal interest":

- In Management Area 12, the plan proposes to restore and perpetuate the native mixed hardwood forest ecosystem, promote a diverse mixture of size and age classes and slowly increase the percentage of pine covertype in the area. Management would slowly increase the percentage northern hardwoods, reduce the percentage of aspen (from approximately 65% to 40%), and maintaining the current percentage of, white birch, oak, red pine, jack pine and white pine. Methods used to increase the percentage of pine and regenerate a mix of hardwood would include selection harvests, shelterwood harvests, seed tree harvests, small clearcut harvests and soil scarification. In the short term, there would be some disturbance to the vegetation and wildlife of special interest to the tribes that occur in the in the areas where harvesting is being performed. In the long term, this management will maintain resources of tribal interest.

- Management for Area 13 proposes to maintain an older forest of primarily shade-tolerant species such as northern hardwoods and hemlock for the scenic values of that setting. Hemlock and white pine regeneration would be monitored and existing pine plantations would be thinned to a naturally appearing density. Areas of aspen and white birch would be passively managed, allowing them to very gradually succeed to the more shade tolerant northern hardwoods. The passive management being applied in this area would not result in any significant impacts to "resources of special tribal interest."

- The existing forest roads in the Lake Minnesuing area would be closed to motorized travel. These trails would be designated as a Type 3 recreational use setting with restrictions, and be maintained as lightly developed trails through periodic mowing. A primitive nature trail would be maintained leading to a picnic area next to the lake. Resulting impacts to "resources

of special tribal interest" would be minimal. Any adverse impacts resulting from the closing of roads to motorized access would be mitigated by the opening of an equivalent length of road in another area of BRSF as described in the Property-Wide management Provision in Chapter Two regarding the use of State Forest Roads.

This description of the existing resources of special tribal interest is organized according to the four "ecological landscapes" that have been used throughout the master planning process. These are: the Lake Superior Clay Plain, the Brule River Ecosystem, the Bayfield Sand Plain, and the Mille Lacs Uplands.

CHAPTER FOUR

ENVIRONMENTAL IMPACTS OF THE MASTER PLAN ALTERNATIVES

Introduction to the Alternatives

In the context of this discussion, an "Alternative" is defined as one of a number of approaches to the management of the Brule River State Forest. An Alternative differs to some degree from the Master Plan described in Chapter Two. The diagram below illustrates the stages in the master planning process that leads up to the development of the Master Plan. The following diagram depicts the planning process and the various stages in the plan's development where the Department invited participation and solicited input from the public and governing bodies

The Master Planning Process

Conduct Research and Gather Data on the Property

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Identify Key Issues

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Develop a Vision Statement and Property Goals

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Develop and Evaluate a Range of Alternatives

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Develop and Evaluate a Preferred Alternative with Options

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Develop the Master Plan and EIS

The input received from public participants and representatives from governing bodies at each stage of the plan's development was taken into consideration in the development of each subsequent stage. Based on the input received during the preceding stages in the master planning process, a number of Alternatives were developed that represented a reasonable range of approaches for managing the Brule River State Forest. Instead of selecting one of the proposed Alternatives, the Preferred Alternative is the amalgamation of elements from a number of the Alternatives. Additional meetings were held to receive comments on the Preferred Alternative. Based on the input received and other criteria, the Preferred Alternative was subsequently refined

in to the Master Plan. For the Purposes of the Environmental Impact Statement (EIS) the Master Plan is considered the "proposed action."

Regulations governing the process of developing a master plan revision require that "the Department shall develop and analyze land management, recreational use and facility development Alternatives...." "Alternatives means, other actions or activities, which may be reasonably available to achieve the same or altered purpose of the proposed action, including the Alternative of no action". In this case, the "purpose of the proposed action" is to manage the Brule River State Forest to fulfill the purpose of a State Forest and "to benefit the present and future generations of residents of this state" described in Wisconsin Statute 28.04. Since this is a revision to an existing master plan, the "Alternative of no action" means the continuation of the current approach to managing the property.

The purpose of developing a reasonable range of Alternatives is to consider the options and comparatively evaluate them. The Alternatives stage in the master planning process serves to provide the basis for discussion with and input from the affected and interested parties. In order to be considered an Alternative must be developed as part of the Master Plan's public involvement process and comply with the legal and regulatory requirements for a Wisconsin State Forest.

The Alternatives were developed as part of a series of steps that comprise the master planning process as a whole. In compliance with the requirements of NR44.04 (7), the Alternatives are based on scientific data gathered, the draft Vision Statement and Property Goals and input received to date through the tribal consultations and public involvement process. The public and tribal input received to date has been qualitatively analyzed and grouped into overarching themes. These themes suggested four possible approaches to managing the resources and four possible approaches to managing the recreation in Brule River State Forest. Using this information as a foundation, WDNR staff prepared two Real Estate Management Alternative, four Resource Management Alternatives and four Recreation Management Alternatives, that represent a reasonable range of possible management options for the Brule River State Forest.

An interdisciplinary team of WDNR staff participated in the development of the management Alternatives. This team included department representatives from fisheries, wildlife, recreation, endangered resources, water resources, and forestry, who possess a thorough understanding of the Brule River State Forest. The team emphasized an ecosystem approach to the management plan, and they each provided technical input regarding their respective specialties.

The Alternatives are not intended to contain the same level of detail included in a completed master plan. The detail included in the Alternatives is intended to provide enough information to allow a comparison and evaluation of the respective environmental impacts. Each Alternative included a "concept statement" that defined its general theme and a description of the proposed management objectives and actions.

The Real Estate Management Alternatives consider the following two themes:

1. Maintain the Current Property Boundary (No Action Alternative)
2. Expand the Property Boundary where the addition of lands would provide significant ecological and recreational benefits.

The Alternatives (or Concepts) and maps were included in Progress Report 8, May 2000.

The Resource Management Alternatives consider following four themes:

1. Scenic Emphasis
2. Ecological Restoration Emphasis
3. Multiple Objective Emphasis (Most similar to No Action Alternative)
4. Timber Production Emphasis

The Recreation Management Alternatives consider the following four themes:

A. Restricted Use and Opportunity; Solitude Emphasis
B. Maintain Existing Uses and Facilities (No Action)
C. Expand Opportunities for Existing Uses
D. Expand Opportunities and Promote Increased Use

These four Recreation Management Alternatives were developed focusing on key issues related to the management of BRSF resources and facilities, such as, canoe landings, road access, campsites, ski trails, etc. The various elements described in the Recreation Management Alternatives are illustrated on the Recreational Facilities Map included in Progress Report 10

A more detailed description of the Alternatives (also referred to as Concepts) and Maps described above was included in Progress Report 8 and distributed to over 700 people on the BRSF Master Plan mailing list. Progress Report, Volume 8, including the Alternatives (Concepts) may be viewed on-line at our website www.dnr.state.wi.us/master_planning/ , or additional copies may be ordered by writing:

Department of Natural Resources
107 Sutliff Avenue
Rhinelander, WI 54501

*Please specify the number of copies requested and your return address.

In the following section, each Alternative (Concept) has been evaluated according to its environmental impacts. Subsequently, this information was combined with a variety of other criteria and used to develop the Preferred Alternative with Options.

Development of the Preferred Alternative with Options

The Preferred Alternative has been developed in order to allow for additional discussion and evaluation and input on aspects of the management where opinions remained divided. This was done by including Options for several of the Land Management Areas. Input received on the "Preferred Alternative" will be considered in the refinement of the Master Plan described in Chapter Two.

Environmental Impacts of the Proposed Alternatives

Real Estate Management Alternatives Summary and Comparison Chart

	Real Estate Management Alternative A	Real Estate Management Alternative B
Concept Statement	Maintain the existing property boundary. (No Action Alternative)	Expand the existing property boundary where the addition of lands would provide significant ecological and recreational benefits.
Existing Property Boundary	Approximately 41,000 acres	Approximately 41,000 acres
Northern Boundary Expansion Area	None	Approximately 17,000 acres
Western Boundary Expansion Area	None	Approximately 1,000 acres
Southern Boundary Expansion Area	None	Approximately 26,000 acres
Total Proposed Boundary Expansion	None	Approximately 44,000 acres

Resource Management Alternatives Summary Table
Organized by Ecological Landscapes

	Resource Management Alternative 1	Resource Management Alternative 2
Alternative Concept Statement	Emphasis on scenic quality and restoration of ecological communities through low impact practices	Restore ecological communities through active management actions
Brule River and Tributaries		
Resource Management Goal:	Management through regulations only; No active instream management	Maintain current fisheries management and regulations (tighten when necessary)
Management Actions:	Eliminate beaver control program	Control beaver numbers
		Add large woody debris to rivers
		Add gravel to low gradient upper Brule
Lake Superior Clay Plain		
Resource Management Goal:	Restore native boreal forest with minimal active management (80-120yrs)	Restore native boreal forest through active and passive management
Management Actions:	Thinning and elimination of existing plantations	Aspen harvesting to encourage conifer dominance; Management will encourage white spruce, white birch, and white pine
	Salvage operations only for those needed for public safety	
	Some direct seeding	Planting not done in plantations, with mechanized site prep to ensure success
	Phase out grassland areas	Grasslands reduced through management
	Remove some created wetlands/ponds	Eliminate drain fields and reestablish sheet flow across landscape
Mille Lacs Uplands		
Resource Management Goal:	Restore native hardwood with supercanopy of pine through passive management	Restore native hardwood with supercanopy of red and white pine through active management
Management Actions:	Thin existing plantations	Use shelterwood or small clearcut areas to promote shade intolerant spp.
	Salvage operations only for those needed for public safety	Shelterwood harvest of non-pine species to prepare for pine regeneration
	Direct seeding and limited planting of red and white pine in natural canopy openings	Maintain Sugar Hill Camp as a large block of mixed older boreal and northern hardwoods

Resource Management Alternatives Summary Table
Organized by Ecological Landscapes
(continued from the previous page)

	Resource Management Alternative 1	Resource Management Alternative 2
Bayfield Sand Plain		
Resource Management Goal:	Allow most areas to grow to mature pine, with a small area of open barrens	Restore Pine Barrens on specific sites and dry forests on the remaining sites
	Attempt to restore pine barrens and dry forests (jack pine, N. pin oak, red pine)	Pine plantations and natural stands managed to mimic natural tree densities
Management Actions:	Encourage natural regeneration of forest types that are appropriate for site conditions	Mechanical scarification and prescribed burns to create conditions suitable for regeneration of native species
	Timber sales would maintain open conditions in portions identified in the Biotic Inventory	
Brule Bog / Spillway		
Resource Management Goal:	Natural processes dominate; conifer-dominated forest (100-200 yrs)	Maintain/Enhance large contiguous conifer dominated forest
Management Actions:	Slopes and terraces follow natural succession	Actively manage slopes and terraces for an older, conifer dominated forest
	Conduct monitoring for invasive species and remove through low impact methods	Promote natural regeneration through thinning pine plantations
		Mechanical scarification, prescribed burning, direct seeding, etc used to promote natural, coniferous forest
		Conduct research on regeneration of bog conifers

Resource Management Alternatives Summary Table
Organized by Ecological Landscapes
(continued from the previous page)

	Resource Management Alternative 3	Resource Management Alternative 4
Alternative Concept Statement	Emphasis on forest and habitat management, while preserving current level of natural resources and aesthetic quality	Manage for timber production and wildlife game species, while restoring ecological communities (but less than other previous Alternatives)
Brule River and Tributaries		
Resource Management Goal:	Maintain current fisheries management and regulations (tighten when necessary)	Maintain current fisheries management and regulations (tighten when necessary)
Management Actions:	Increase stocking of current fish species	Increase stocking levels; and potentially stock cold water species not currently present
	Control beaver numbers	Control beaver numbers
	Add large woody debris to rivers	Add large woody debris to rivers
	Add gravel to low gradient upper Brule	Add gravel to low gradient upper Brule
Lake Superior Clay Plain		
Resource Management Goal:	Restore boreal forest North of HWY 13 Maintain mix of aspen and conifers South of HWY 13	Restore smaller areas of older boreal forest; Manage young conifer, aspen/birch mix for timber production
Management Actions:	North of HWY 13: active and passive techniques	North of HWY 13: in specific sites using active and passive techniques
	South of HWY 13: Active management with clearcuts	South of HWY 13: use all techniques including clearcuts
	Promote habitat for early successional species (grouse, deer, etc.) using clearcut harvests in various size and shapes to	Maintain grasslands/wetlands for wildlife benefits
	Maintain grasslands/wetlands with mowing and/or burning	Eliminate ditch flow of water and reestablish sheet flow across landscape
	Eliminate ditch flow of water and reestablish sheet flow across landscape	
Mille Lacs Uplands		
Resource Management Goal:	Similar to Alternative 2; more oak and aspen management	Similar to Alternative 3, but more emphasis on aspen and white pine
Management Actions:	Management includes a mix of selective and regeneration harvest techniques	Increase acreage of aspen using clearcut harvests
	Manage Sugar Hill Camp to provide older aged class forest with a mix of size, age classes and patch sizes.	Regeneration of white pine encouraged through increased acreage of shelterwood harvest, planting, etc.
	Establish pine species similar to Alternative 2	

Resource Management Alternatives Summary Table
Organized by Ecological Landscapes
(continued from the previous page)

	Resource Management Alternative 3	Resource Management Alternative 4
Bayfield Sand Plain		
Resource Management Goal:	Restore Sand Barrens on a specific site and dry forests on remaining sites	Restore Sand Barrens on a specific site and manage the rest to produce time products
Management Actions:	Similar to Alternative 2	Retain aspects of Bayfield Sand Plain
	Retain a core area for Bayfield Sand Plain restoration potential	Manage for primarily pine timber production as a priority; use economic rotations; site preparations for natural regeneration and plantings
Brule Bog / Spillway		
Resource Management Goal:	Maintain/Enhance large contiguous conifer dominated forest; protect rare spp	Maintain/Enhance large contiguous conifer dominated forest; protect rare spp
Management Actions:	Similar to Alternative 2	Similar to Alternative 2
	Aspen and openings managed for wildlife	Terraces associated with sideslopes will be managed for timber production, with techniques similar to the Sand Plain

Recreation Management Alternatives (Concepts) - Comparison Chart
(Key: ----- = not mentioned in Concept; No = not allowed in concept)

	Recreation Management Alternative A	**Recreation Management Alternative B**	**Recreation Management Alternative C**	**Recreation Management Alternative D**
Concept Statement	Provide limited recreational experiences centered on remoteness and solitude.	Provide recreational activities, which do not change the current character of the property.	Provide recreational activities, while preserving the forest's current level of natural resources and aesthetic quality	Provide a wide range of recreational activities
Facilities				
Canoe Landings	Less	Same	Same	More
Limiting Number of Paddlers	Yes, permit system	Yes, voluntary	No	No
Road Access	Less	Same	Same	Same
Angler Access Points	Less, permit system	-----	More	More
Angler Parking Lots	Same	-----	More	More
Hiking Trails	Less, maintained	Same	More	More
ATV Trails	No	Same	More	More
Off-Road Bike Trails	Less	Same	More	-----
Cross-Country Ski Trails	No grooming	Same	More	More
Dog Sledding Trail	----	-----	----	Yes
Hunter Walking Trail	-----	-----	----	More
Interpretive Trails	Less	More	More	More
Snowmobile Trails	No	Same	More	More
Family Campsites	Less	Same	Same	Yes
Group Campsites	Less	Same	More	More
Remote Campsites	-----	-----	More	More
Special Use Campsites	-----	-----	----	Yes
Public Shooting Range	-----	-----	-----	Yes

ALTERNATIVES CONSIDERED AND THEIR ENVIRONMENTAL IMPACTS

Impacts to Physical and Biological Resources

Water Quality, Aquatic Habitat, Soil, Hydrology, Fish and Aquatic Species

The quality of the habitat for aquatic animals in the stream and river habitats is primarily dependent on the quality and quantity of water, which is primarily dependent on the basin hydrology and soil. The primary threats to water quality and aquatic habitat in the Brule River and tributaries are increased runoff and resulting bank erosion on the clay plain soils and impacts for water flow or wetlands associated with the upper Brule springs.

As a result of standard management beyond the requirements of Best Management Practices for Water Quality and decades of experience managing land and water within the Brule River watershed, little negative impacts to would have been expected from any of the proposed Resource Management Alternatives, Options or the Master Plan. Those proposed Resource Management Alternatives (Alternative 1 and passive Options in the Preferred Alternative) with less active management on the clay plain would generally have less potential to create short term increased runoff. However, the acreage that would have been managed under any of the more active resource management alternatives and options was very small so short term negative impacts would have been minimal. Less than 1% of the land in the clay plain would have been under active management at the same time.

Long term reduction in runoff would benefit optimally from a watershed with 20-40% of the acreage in open habitat or forests younger than 15 years old (Verry 2001, Gasser 2002). When snowmelt tends to occur all at once the greatest peaks in runoff events occur and the potential for bank erosion and negative impacts to water quality are greatest (Veery 2001). A landscape with varied community types that produce desynchronized snowmelt helps to avoid these peak runoff events. All alternatives, options and the Master Plan would have maintained the landscape in this range for the next 50 years. Eventually (50-100 years), alternative 1 and the passive management options for the clay plain in the preferred alternative would have resulted in less than 20% of the landscape in open habitat or younger deciduous forest thus reducing the benefits of a desynchronized snowmelt. The variable that is difficult to predict in these discussions is the condition of the land outside of state ownership but within a sub watershed. Under current management most of these private lands on the clay plain are forested and have a diversity of forest age classes. Additional lands purchased for the state forest on the clay plain would help assure a proper balance of land management strategies to support water quality.

All resource management alternatives, preferred alternative options and the Master Plan protect the wetlands and springs of the upper Brule River and tributaries so positive impacts would be expected for water quality and aquatic habitat. All Resource Management Alternatives in the sand soils would have continued to support natural hydrology and positive water quality impacts. The recreation Alternatives C and D would have added more recreational developments that

would have had small scale negative impacts to soil and infiltration rates and the project sites. Alternative D added year round ATV trails on the sand soils which would have exposed soils and likely had negative erosion impacts to the trail areas.

Aquatic Habitat/Aquatic Species

All Alternatives, options and the Master Plan would have continued to support the excellent water quality that is important to the aquatic habitats on the BRSF, however, there were some differences in aquatic habitat management. Alternative 1 has resulted in a decline in habitat quality for salmonids and aquatic invertebrates. It would have reduced the constructed wetland habitats and reduced habitat for open wetland wildlife. It would have increased wetland habitat along streams by eliminating beaver control but would have reduced stream habitat and access to spawning beds. Resource Alternatives 2-4 proposed to maintain the current levels of instream habitat management and beaver control while Alternatives 3 and 4 would have provided for additional fish stocking. The Master Plan maintains current fish habitat management, wetland management and beaver control.

While there has been suggestion that large numbers of anglers and paddlers in the river have a negative impact on aquatic habitat, no system wide negative impacts have been documented. The Recreation Management Alternatives A and B explored methods to reduce numbers of users in the river more for the benefit of reduced user conflict than reduced impact to the resource. Recreation Alternative A would have reduced river user numbers if legal authority was granted. This may have had a positive impact on the aquatic habitat. Otherwise, the other Recreation Alternatives, Options and the Master Plan maintained present levels of river recreation. The Master Plan will increase education and law enforcement for river recreation to encourage more respect for other users, landowners and the resource among users.

Terrestrial Vegetation and Wildlife

Lake Superior Clay Plain

The dominant upland community types on the state forest clay plain lands (Management Areas 1-4) are aspen/white birch (60%), spruce-fir (13%), grasslands (7%) and northern hardwoods (5%). Common understory plants include upland alder, hazelnut, big leaf aster and wild sarsaparilla. Balsam fir and red maple are common seedlings and saplings. The Resource Management Alternatives proposed different levels of management intensity and proposed to shift acreages of these basic community types. All the Alternatives, Options and the Master Plan would have resulted in a decrease from present condition in the dominance of aspen/birch and the increase in conifers, primarily balsam fir, white spruce and/or white pine. Little change in forest composition would be experienced in the next 50 years with significant changes not realized until greater than 100 years. Alternative 4 would have maintained the most aspen/birch and the conifers would have been dominated by younger age classes. Moving from Resource Management Alternative 4 to 1, there was a progressive decrease in aspen/birch, an increase in conifer and an increase in the overall age of the forest. The passive management techniques of Alternative 1 would have resulted in more balsam fir and less white spruce and white pine among the upland conifers because of the need for active management to successfully plant these species from Resource

Management Alternative 1 and 2 would have eliminated the grasslands while they would have been retained in from Resource Management Alternative 3 and 4. The unique opportunity to manage for northern hardwoods at Sugar Camp Hill was generally consistent across all from Resource Management Alternative and Options. The Options for the clay plain that were presented in the Preferred Alternative were essentially the mix of goals presented in the from Resource Management Alternative 1-4 but with different management areas within the clay plain representing the different alternatives. Therefore, the impacts of the Options in the Preferred Alternative would be within the range of management between from Resource Management Alternative 1-3. The proposed plan is most like from Resource Management Alternative 3, however, the acreage managed for aspen/birch habitats in the long term is much smaller than proposed in from Resource Management Alternative 3.

The from Recreation Management Alternative A-D would have little impact on the terrestrial vegetation and wildlife of the clay plain. Real estate alternative 1 proposed no expansion of the boundary in this area and would have limited the ability to achieve landscape level restoration of a boreal forest. The master plan provides for a boundary expansion to achieve this level of ecosystem management.

Terrestrial wildlife that prefer early successional forests of aspen and white birch such as ruffed grouse, white-tailed deer, snowshoe hare and golden-winged warbler would experience the least negative impacts from Resource Management Alternative 4 with increasing negative impacts across a gradient to Resource Management Alternative 1. The Master Plan would have an impact between Resource Management Alternative 2 and 3. During the first 50 years little change populations of these species on the BRSF would be observed but after 50 years a slow decline would be expected. Species that would favor older conifer dominated forests such as blackburnian, cape may and pine warblers; wood frogs and blue spotted salamanders would experience the opposite trend across the Resource Management Alternatives. The grassland wildlife such as sharp-tailed grouse, upland sandpiper, savannah sparrow and nesting waterfowl would lose habitat in Resource Management Alternative 1 and 2 and maintain habitat in Resource Management Alternative 3, 4 and the Master Plan. The loss of grassland habitat would occur more rapidly within the next 20 years in Resource Management Alternative 1 and 2.

<u>Mille Lacs Uplands</u>

The Mille Lacs Uplands portion of the BRSF is about 3,400 acres (Management Areas 12 and 13). The dominant upland community types in this area are aspen (55%), white birch (15%), red oak (7%), red pine (7%), and northern hardwood (2%). Hazelnut, blueberry, mountain maple and big leaf aster are common understory species. The age of the forest is fairly evenly distributed across age classes from 10 –100 years old. While not ideal conditions for northern hardwoods these areas represent some of the best sites within the BRSF for this natural community. All Resource Management Alternative, Options and Master Plan to manage for northern hardwoods in these areas but with different emphases. The recreation and real estate alternatives would have little impact to lands in this landscape.

Resource Management Alternative 1 and one option in the preferred alternative emphasized passive management for scenic values and old trees. This management direction would start to produce old growth characteristics (old trees, dying trees, coarse woody debris) in 100 years,

increase shade tolerant species such as red and sugar maple and decrease areas of pine, aspen, white birch and red oak. Resource Management Alternative 2-4 and an option in the preferred alternative generally emphasized native community management for a northern hardwood forest dominated by sugar and red maple with a mix of red oak, red/white pine, aspen and birch. The gradient from Resource Management Alternative 2 through 4 moved from more maple and less oak, pine and aspen to less maple and more oak, pine and aspen. The plan has one management area similar to Area 1 and one management area similar to Resource Management Alternative 3. The plan includes 2 reference sites with older red and white pine. The plan is similar to current management except for the reference sites and a greater emphasis on older age classes.

Bayfield Sand Plains

The Bayfield Sand Plain portion of the BRSF is about 16,400 acres (Resource Management Areas 6-11). The upland community types within this area are red pine (26%), aspen/white birch (24%), jack pine (16%), scrub oak (10%) and grass (2%). Common understory plants include hazelnut, low sweet blueberry, sweet fern, bracken fern and wintergreen. The low impact and passive management intent of Resource Management Alternative 1 would result in an older forest of primarily red pine, jack pine, scrub oak and aspen/white birch on most of this area within the next 50 years. Open barrens, shrub/ground plants and red/jack pine regeneration would be limited. After 100 years a slow shift to more shade tolerant hardwoods would be noticed. Resource Management Alternative 2-4 would produce a core area of open pine barrens surrounded by a shifting mosaic of red/jack pine, scrub oak and aspen/birch. Resource Management Area 4 would create a younger dry pine forest with fewer associated shrub/ground plant species than Resource Management Alternative 2 and 3. The present management provides for maintenance of most the present community types with less permanent open habitat than in Resource Management Area 2-4. The Preferred Alternative recognized the different potentials within this landscape through a range of proposals for different management areas. This range represented the range found in Resource Management Alternative 1-4. The Options for Resource Management Area 2 areas in the Preferred Alternative that focused on forest production were a blend of Resource Management Alternative 3 and 4 while the native community management Options were similar to Resource Management Alternative 2 and 3. The Master Plan has six management areas that provide for elements of Resource Management Alternative 1-4 which would result in an increase in older mixed hardwood/pine forest, jack pine and open communities in specific areas while maintaining significant areas of aspen/birch, red pine and scrub oak.

The Recreation Alternative A-D would have little impact on the terrestrial vegetation or wildlife of this landscape. Recreation Alternative D proposes year round ATV trails which would likely increase erosion and impact vegetation within the trail footprint and potentially disturb wildlife.

Restoration of a dry pine and barrens landscape requires more acreage than is currently available within the BRSF. Real Estate Alternative 1, which would have provided for no boundary expansion would significantly restrict the ability to achieve ecosystem level management goals within this landscape. The Master Plan provides for a boundary expansion, which would potentially provide the lands necessary for this work.

During the first 50 years, little change in the current diversity of wildlife would be expected under management of any of the four Resource Management Alternatives. Under Resource

Management Alternative 1, species associated with older pine and hardwood forests such as pileated woodpecker, blackburnian warbler and pine warbler would experience the greatest increase in habitat while species associated with open barrens habitat such as sharp-tailed grouse, vesper sparrow, savannah sparrow and badger would have less habitat. Resource Management Alternatives 2-4 would provide the open habitat along with the diversity of pine and hardwood forest habitats preferred by species such as ruffed grouse, white-tailed deer, black bear and several species of common songbirds. Resource Management Alternative 4 would result in the largest area of pine plantations among the alternatives.

Brule River Ecosystem

The Master Plan contains more upland habitat within the management areas (4 and 5) focused on the Brule River Ecosystem than was proposed in any of the Resource Management Alternatives or Options within the Preferred Alternative. Therefore more forestland is contained within passive or low-level management than was proposed previously. The management discussion in the resource alternatives focused only on the Brule Bog and Spillway in relation to lands in this ecological area. Resource Management Alternative 1's passive management would have allowed development of an older forest along the slopes and terraces but did not provide for regeneration management of conifer species. Resource Management Alternatives 2-4 provided for a conifer-dominated forest that was progressively younger along a gradient from Resource Management Alternatives 2 through 4. The Master Plan is similar to a combination of Resource Management Alternatives 1 and 2.

The recreation and Real Estate Alternatives would have little impact on the border uplands of this ecosystem.

Resource Management Alternative 1 would have provided more habitats for older conifer forest species such as pileated woodpecker, pine warbler and rare species discussed below. Resource Management Alternatives 2-4 would also provide habitat for wildlife preferring conifer habitats such as blackburnian warbler, cape may warbler and blue spotted salamander. Wildlife found across a range of habitats such as black bear and fisher would also benefit across the Resource Management Alternatives 1-4.

Impacts to Aesthetic Resources

Impacts Resulting from Real Estate Management Alternatives 1 and 2

Real Estate Management Alternative 1 proposed to maintain the current property boundary, therefore no impacts to scenic resources would result. Real Estate Management Alternative 2 described in Chapter Two and the impacts to aesthetic resources are evaluated in the corresponding section of Chapter Three.

Impacts Resulting from Resource Management Alternatives 1 - 4

As described in detail in Chapter 3, the aesthetic resource of primary importance in the BRSF is the scenery experienced from the Bois Brule River. Other areas particularly valued for their aesthetic quality are located along other waters, scenic roads and trails, the areas surrounding

campgrounds, and at several scenic vistas. Important scenic vistas include; the picnic area at the mouth of the Brule River, the Waino Rock overlook, and the view of the Brule Bog from the Portage Trail. Of secondary importance is the overall aesthetic quality of the forest as seem from any number of locations frequented by visitors and adjacent properties.

Impacts to these scenic resources resulting from Resource Management Alternatives 1-4 would primarily be a function of the different approaches to managing the forest communities in each.

Little change in forest composition, and subsequently the aesthetic resources, would be experienced in the next 50 years with significant changes not realized until greater than 100 years. Therefore, impacts to the aesthetic resources as the result of all of the Resource Management Alternatives would be minimal in the next 50 years. Generally, any impacts to the aesthetic resources would be expected to increase slightly progressing from Resource Management Alternatives 1 to 4. The emphasis in Resource Management Alternative 1 being on the "aesthetic quality and the restoration of ecological communities through low impact practices" would therefore result in a shift in the aesthetic character of the forest toward an older, more coniferous dominated forest. The emphasis in Resource Management Alternative 4 being on the active "management for timber production and wildlife game species, while restoring ecological communities" would result in a forest with a mixture of both young and old tree stands and a mixture of covertypes. Some areas would be managed to provide forest products and wildlife habitat, resulting in areas of younger appearing forests.

A noteworthy difference in the impacts to the scenic character would occur in the grassland and wetland areas in the Lake Superior Clay Plain, as the result of differences in the management proposed in the Resource Management Alternatives. Alternatives 1 proposed to eliminate the existing grassland and wetland areas, Resource Management Alternative 2 proposed to reduce them and Alternatives 3 and 4 proposed to retain them. Retaining the grasslands and wetlands would maintain the existing open views and aesthetic character. Eliminating the grasslands and wetlands and allowing them to gradually revert to a wooded condition would very gradually but significantly alter the visual character of these areas. The open quality and longer views would be gradually replaced by more enclosed quality and shorter views.

All of the Resource Management Alternatives proposed to manage the Brule Bog and River in essentially the same way. The differences between the management proposed for these areas were limited to decisions regarding the management of beaver, and whether or not to perform timber harvests on the slopes and terrace areas adjacent to the Bog. Resource Management Alternative 1 proposed to eliminate the beaver control program while Resource Management Alternatives 2 and 3 proposed to continue it. Impacts to the aesthetic resources resulting from the elimination of the current beaver management would be expected to impact the lowland forest areas as a result of the predicted flooding of these areas for prolonged periods. Such flooding would be expected to result in a die off of trees in this area, and of particular aesthetic and ecological importance, the loss of the remnant stands of white cedar in this area.

Resource Management Alternative 1 also proposed no timber harvesting on the slopes or terraces. Resource Management Alternatives 2 and 3 proposed to "actively manage the slopes and terrace areas for and older, conifer dominated forest". Resource Management Alternative 4 proposed to

manage the terraces for timber production". The resulting impacts to the aesthetic resources in these areas, again, would be expected to slightly increase progressing from Resource Management Alternative 1 to 4.

Impacts Resulting from Recreation Management Alternatives A-D
Impacts to these aesthetic resources resulting from the Recreation Management Alternatives A-D would primarily be a function of the reduction, maintenance or increase in the recreational capacity of facilities in each. The specific facilities and their proposed management included in each of the Recreation Alternatives is described in the preceding Summary Table.

Recreation Management Alternative A proposed to provide "limited recreational experiences centered on remoteness and solitude." It proposes to slightly reduce the level of recreational use from the current capacity in selected sites where the use is approaching a level where the aesthetic quality is degraded. Recreation Management Alternative B proposes to "provide recreational activities that do not change the current character of the property". Recreation Management Alternatives C and D progressively propose approaches to recreation management that "provide an increased level of use and variety of recreational activities. Since high levels of recreational use often impact aesthetic resources would that would occur in areas where high numbers of recreational users are concentrated. Therefore the impacts to the scenic resources increase slightly, progressing from Recreation Management Alternative A to D. Therefore, the impacts to the aesthetic resources increase slightly, progressing from Recreation Management Alternative A to D. The aesthetic character of the forest expected to result from the management proposed in Recreation Management Alternative A would be a shift toward a more quite, solitary experience and a more undisturbed and natural scenic quality. Progressively, from Recreation Management Alternative A to D, the aesthetic character would be increasingly impacted by the level of recreational use. Recreation Management Alternative D would be expected to result in some shift in the aesthetic character of the forest to a noisier and less solitary experience, and a less natural and more developed aesthetic quality. Recreation Management Alternative D also proposes a public shooting range, which would be expected to generate a significant amount of noise in its vicinity.

The aesthetic resource of primary importance in the BRSF is the Bois Brule River. The Bois Brule River is a focus of high levels of recreational use by paddlers and anglers. It is generally agreed that the current recreational use is approaching a level that degrade the aesthetic quality is occurring. Recreation Management Alternative A proposed to limit the number of paddlers with a permit system. Recreation Management Alternative B proposed a voluntary and educational system for limiting the number of paddlers. Recreation Management Alternatives C and D proposed no limit on paddlers. It would be expected that impacts to the aesthetic quality along the River would progressively increase from Alternative A to D. The expected shift in the aesthetic character in the river corridor would be similar to the description for the Recreation Management Alternative A – D in the preceding paragraph.

Preferred Alternative included Options for the management of paddlers on the River. One Option proposed to reduce the impacts to the River through on-going public involvement in the management of the river's recreational use, and a program of user orientation and education. This

Option also proposed the construction of a new canoe landing at CTH FF in order to better distribute the numbers of paddlers using the existing landings.

A second Option proposed to limit the number of users entering the river through state owned lands, and did not purpose to construct a new landing at CTH FF. The impacts to the River's aesthetic quality would be less under the Option that limits the number of users entering the river through state owned lands. Impacts resulting from the other Option that propose to construct a landing at CTH FF and to reduce the impacts to the River through on-going public education and involvement is further described in Chapter Two and evaluated in Chapter Three.

Impacts to Cultural Resources

Real Estate Management Alternative 1 proposes to maintain the current property boundary, therefore no impacts to cultural resources would result. Real Estate Management Alternative 2 proposes to expand the current property boundary in the Northern and Southern Boundary Expansion Areas described in Chapter Two. Real Estate Alternative 2 is described in detail in Chapter Two and the impacts to cultural resources are evaluated in corresponding section of Chapter Three.

The actions proposed in each of the Recreation Management Alternatives and Options are the same in each, in that they all would not impact include compliance with DNR Manual Code 1810.1 the other protective measures described above. Therefore, the proposed the Resource Management Alternatives 1-4, Recreation Management Alternatives A-D and the Preferred Alternative Options" should have no negative impact on known cultural resources.

Impacts to Recreational Resources

Real Estate Management Alternative 1 proposes to maintain the current property boundary, therefore no impacts to recreational resources would result. Real Estate Management Alternative 2 proposes to expand the current property boundary by adding about 44,000 acres to the state forest in three different areas (Refer to the Land Classification map in the Maps Section at the back of this Document). Approval of the boundary expansion would authorize the Department to purchase land within the expanded boundary from willing sellers. While there is the potential for some large purchases, acquisition would likely proceed over a long time period, and it is unknown when any parcels may become available.

State purchase of lands in the expansion area would have only modest impact on the recreational opportunities because a large portion of the boundary expansion areas are already open to public recreation under the Managed Forest Laws (MFL) program. Industrial forest companies own about 70 percent of the total expansion area most of these lands other lands are open to the public for uses such as wildlife viewing and hunting under the MFL and FCL Programs. Approximately 32,000 acres (72%) of the total 44,000 acres Proposed Boundary Expansion Area is currently open to limited public recreational use.

The proposed Northern Boundary Expansion Area is approximately 17,000 acres, with 46% currently open to limited public recreation. Approximately 13% of the 1,000-acre Western

Boundary Expansion Area currently open to limited public recreation. The Southern Boundary Expansion Area covers about 26,000 acres, the majority (88%) is industrial forest. Approximately 88% of the 1,000-acre Southern Boundary Expansion Area is currently open to limited public recreation. On a regional scale the impacts to the recreational opportunities / resources, resulting from the proposed Property Boundary Expansion, would be minimal. In comparison, the large amounts of land in the region that are currently open to the public recreation; such as the Chequamegon National Forest, the Governor Knowles State Forest, the Flambeau River State Forest and many county forests.

The Southern Boundary Expansion Area contains public recreation trails that have easements across private lands. Public ownership would assure the long-term use of those trails. There would be a potential to develop additional appropriately sited and environmentally suitable recreational facilities on the lands included in the proposed boundary expansion area. Upon the acquisition of sufficiently large blocks of land, the development of recreational facilities on these if not included in the Recommended Master Plan, would require a "minor master plan amendment" in accordance with NR 44.04(1)(e).

Impacts on existing recreational resources from Resource Management Alternatives 1- 4 would primarily be a function of the different approaches to managing the forest communities in each. Impacts resulting from a shift in the in forest composition / habitat would be limited to recreational activities that focus on the fish and game species, such as hunting and fishing. Other recreational opportunities that might be impacted by actions proposed in the Resource Management Alternatives would include; berry-picking, plant and wildlife viewing, and the experience of scenery that is an integral part of any outdoor recreational activity. For a detailed description of impacts to terrestrial and aquatic species resulting from Resource Management Alternatives 1-4, refer to the section of this chapter titled "Impacts to Physical and Biological Resources."

Little change in forest composition, and subsequently the existing recreational resources, would be experienced in the next 50 years with significant changes not realized until greater than 100 years. Therefore, impacts to the existing recreational resources as the result of all of the Resource Management Alternatives would be minimal in the next 50 years. Over a 100-year period, any impacts to the existing recreational resources would generally be expected to increase slightly progressing from Resource Management Alternative 1 to 4. Resource Management Alternative 1 would have provided the best habitat for hunting and berry-picking with at steady decrease in habitat quality across the Resource Management Alternative 4. On a regional scale, the impacts to the recreational opportunities / resources resulting from the actions proposed in the Resource Management Alternatives would be minimal in comparison to the large amounts of land in the region that are currently open to the public recreation; such as the Chequamegon National Forest, the Governor Knowles State Forest, the Flambeau River State Forest and many county forests.

Impacts to the existing recreational resources resulting from Recreation Management Alternatives A-D would be a function of the different approaches to managing the forest's recreational uses and facilities proposed in each. See Recreation Management Alternatives - Comparison Chart for the "Concept Statement" that describes the central idea behind each of the four Alternatives and how the various types of facilities would be managed under each.

Recreation Management Alternative A proposes to "provide limited recreational experiences centered on remoteness and solitude". The resulting impact on the existing recreational resources would be to reduce the capacity of some of the facilities and most significantly, to limit the number of users accessing the river through state owned lands. The reduction in the number of recreational users and the capacity of some facilities would adversely impact the recreational opportunities provided by the forest's resources. This reduction in the number of recreational users and facility capacity would be expected to increase the quality of the user's recreational experience by reducing the crowding and user conflicts that have been reported during periods of peak use. This would be a positive impact to some of the recreational opportunities provided forest's resources.

Recreation Management Alternative B proposes to "provide recreational activities, which do not change the current character of the property". Therefore, no significant impacts to the existing recreational resources would result.

Recreation Management Alternative C proposes to "provide recreational activities, while preserving the forest's current level of natural resources and aesthetic quality". It would increase the amount or capacity of recreational facilities such as; angler access points and parking areas, hiking trails, ATV trails, off-road bike trails, ski trails, interpretive trails, snowmobile trails, group campsites and remote campsites.

The resulting impact on the existing recreational resources would be to increase the capacity of some of the facilities and not limit the number of users accessing the river through state owned lands. The increase in the number of recreational users and the capacity of some facilities would positively impact the recreational opportunities. This increase in the number of recreational users and facility capacity would be expected to degrade the quality of the user's recreational experience by increasing the crowding and user conflicts that have been reported during periods of peak use. This would be an adverse impact to some of the recreational opportunities.

Recreation Management Alternative D proposes to "provide a wide range of recreational activities". It would increase the amount or capacity of recreational facilities by including the increases proposed in Alternative C, along with the following; an additional canoe landing, a dog sledding trail, additional hunter walking trails, special use campsites and a public shooting range. The resulting impacts to the recreational resources would be the same as described for Recreation Management Alternative C but somewhat more significant.

On a regional scale the impacts to the recreational opportunities / resources resulting from the proposed Recreation Management Alternatives would be minimal in comparison to the large amounts of land in the region that are currently open to the public recreation; such as the Chequamegon National Forest, the Governor Knowles State Forest, the Flambeau River State Forest and many county forests.

The only actions proposed in the "Preferred Alternative- Options" that would result in impacts to the existing local recreational resources concerned the management of recreation on or near the river. The "option" not selected proposed to limit access to the river and to not construct a new

canoe landing at CTH FF. The limiting of the number of recreational users allowed to access the river would adversely impact the recreational capacity of the existing recreational resources. This reduction in the number of recreational users and facility capacity would be expected to increase the quality of the user's recreational experience by reducing the crowding and user conflicts that have been reported during periods of peak use. This would be a positive impact to some of the recreational opportunities provided forest's resources.

Impacts to Land Ownership and Land Use

Real Estate Management Alternative 1 proposes to maintain the current property boundary, therefore no impacts to land ownership or land use would result. Real Estate Management Alternative 2 proposes to expand the current property boundary by adding about 44,000 acres to the state forest in three different areas shown on the Land Management Classification Area Map. Refer to the section of Chapter Two titled "Real Estate Management" for a detailed description of the Property Boundary Expansion Areas and additional information regarding Department acquisition policies. Refer to the section of Chapter Three titled "Impacts to Land Ownership and Land Use" for an evaluation of the resulting impacts.

The expansion of the property boundary proposed in Real Estate Alternative 2 is the same as in the Preferred Alternative and the Master Plan. Refer to the section of Chapter Two titled "Real Estate Management Plan" for a detailed description of the proposed property boundary expansion areas and additional information regarding Department acquisition policies.

The Resource Management Alternatives 1-4 propose a number of actions that would impact the land use or land cover on lands within the current property boundary. The impact to the land cover would be the result of forest management actions proposed in the Resource Management Alternatives. The most notable difference in the Resource Management Alternatives affecting the land cover concerns the areas in the Lake Superior Clay Plain that are currently managed grasslands and the areas that are wetland impoundments.

Resource Management Alternatives 1 proposes to "phase out the grassland areas" and to "remove some of the wetland impoundments". The impacts of these actions to the land cover would be that they would very gradually revert to forestland. The impacts to physical and biological resources and other resources are discussed in detail in the corresponding sections of this chapter.

Resource Management Alternatives 2 proposes to reduce the size of the areas managed as grasslands and retain the existing wetland impoundment areas. No impact would result from maintaining the existing wetlands. Only a minor impact to the existing land cover would result from reducing the size of the maintained grassland. The remaining unmanaged grasslands would gradually revert to forestlands.

Both Resource Management Alternatives 3 and 4 propose to retain the grasslands and wetlands. Therefore, there would be no resulting impacts to land use / land cover. Other impacts to Land Use and Land Cover resulting from Resource Management Alternatives would be minimal. Any differences between the impacts to land cover resulting from the Proposed Resources

Management Alternatives would be in terms of the forest composition over a period of 50-100 years. A description of the result of Resources Management Alternatives 1-4 are discussed and the impacts evaluated under the section of this Chapter titled "Impacts to Physical and Biological Resources."

The Preferred Alternative Option that was not selected, and which addressed the grassland and wetland areas, proposed to maintain the wetlands but phase out the grasslands. The grassland would not be mowed or burned and consequently, they would gradually revert to a forestland cover. The resulting impacts to land cover would be as described above for Resource Management Alternative 1.

Any impacts to land use / land cover from actions proposed in Recreation Management Alternatives A-D would be the result of the proposed construction of new recreation facilities. The number and size of the recreational facilities proposed progressively increased from Recreation Management Alternative A to D. The impact to land use / land cover also progresses accordingly. However, even under Alternative D, which proposes the greatest number of new facilities, the number of acres that would change from forestland to developed recreation land would be less than 30 acres. In the context of a 40,000-acre property, the impacts resulting for this change would be minimal.

The Preferred Alternative Options that were not selected, resulted in minimal impacts to land use / land cover resulting from the development of recreational facilities.

FISCAL IMPACTS TO THE STATE

State Forest Operation Costs and Staffing Estimates

Financial Impact

The financial impacts of the Resource Management Alternatives 1-4 would be similar to that described for the Master Plan in Chapter Three. Real Estate Alternative 1, which did not expand the boundary, would not result in additional management costs. However, Real Estate Alternative 2 contained in the Master Plan would require the additional staff noted in Chapter Three. The Recreation Management Alternatives propose different management pictures but all require additional staff time in either user management or management of additional facilities. Alternative D proposes the maximum level of use and new types of uses, therefore additional LTE staff at $35,000/year would be necessary above that proposed for the Master Plan.

State Forest Revenue Impacts

Timber

The financial impacts of the alternatives to timber sale revenue are difficult to predict. Generally external market forces are likely to have a greater impact to the change in revenue than the prescriptions but gross changes in management focus would have an impact. Resource Management Alternatives 2-4 and the master Plan would likely maintain levels of timber sale revenue similar to present conditions although Resource Management Alternative 4 may have had slightly more revenue generation. Considering the mix of pine and hardwood timber sales necessary to meet the goals of Alternatives 2-4 annual timber revenue will likely remain at $300,000-$400,000 in 2002 dollars. Alternative 1 would see a slow decline in revenue for about 15-20 years and then a significant drop to about 20% of current levels.

Recreation

Recreation revenue is a minor source of revenue on the property, roughly 10% of the current timber revenue. The Recreation Management Alternatives A-D would likely have little impact on the overall state forest revenue. Fewer trail and camping opportunities in Recreation Management Alternative A would result in about a $15,000/ year drop in trail and camping fees, alternative B would provide levels similar to current, Recreation Management Alternative C would provide an increase in trail fees of several $1,000, while Recreation Management Alternative D may result in an increase from trail and camping fees of about $15,000/year.

Impacts to Local Governments and Taxpayers

Real Estate Management Alternative 1 proposes to maintain the current property boundary, therefore no fiscal impacts to local governments would result. Real Estate Management Alternative 2 and the Preferred Alternative both propose the same property boundary expansion described in detail in Chapter Two in the section titled “Real Estate Management.” The reader should refer to the section of Chapter Three titled “Fiscal Impacts to Local Governments” for a

detailed discussion of impacts to local governments and school districts that would result from the property boundary expansion. This section also includes a discussion of impacts to town roads and county roads and highways, as well as, any impacts to local law enforcement and emergency services.

This impact evaluation of Resource Management Alternatives 1-4, the Recreation Management Alternatives A-D and the Preferred Alternative Options limit focus to the state owned lands within the current property boundary. The management actions proposed in any of the Resource Management Alternatives would be expected to result in minimal impacts to public roads, or highways, or law enforcement and emergency services, in the vicinity of the Brule River State Forest.

No significant changes in the traffic volumes or the level of use by large trucks would be expected under any of the Resource Management Alternatives. The level of use by trucks and other equipment related to timber harvesting would be slightly less than the current levels of use under Resource Management Alternative 1. They would remain generally equal to current levels of use under Resource Management Alternatives 2 and 3. And they would increase only slightly over current levels of use under Resource Management Alternative 4, however the increase would be minor and would not result in any significant impacts to the public roads or highways. The level of public road and highway use by forest recreational visitors would be less than the current levels of use under Recreation Management Alternative A. They would remain generally equal to current levels of use under Recreation Management Alternatives B and C. And they would increase only slightly over current levels of use under Recreation Alternative D, however the increase would be minor and would not result in any significant impacts to the public roads or highways.

No significant changes in the level of demand on local law enforcement and emergency services would be expected under any of the Alternatives or Options. The level of demand on local law enforcement and emergency services would not significantly vary between the Alternatives, or from the current forest management.

Impacts resulting from the Proposed Preferred Alternative Options not selected would also be minimal.

Other Socio-Economical Impacts

Economic Impacts

Real Estate Management Alternative 1 proposes to maintain the current property boundary, therefore no economic impacts, including economic, social or energy impacts would result. Real Estate Management Alternative 2 proposes to expand the current property boundary by adding about 44,000 acres to the state forest in three different areas shown on the Land Management Classification map. The expansion of the property boundary in Real Estate Alternative 2 is the same as in the Preferred Alternative and the Master Plan. Refer to the section of Chapter Two titled “Real Estate Management Plan” for a detailed description of the property boundary expansion areas and additional information regarding Department acquisition policies. Refer to

the section of Chapter Three titled "Other Socio-Economic Impacts" for an evaluation of the resulting impacts.

This impact evaluation of Resource Management Alternatives 1-4, the Recreation Management Alternatives A-D and the Preferred Alternative Options limit its focus the state owned lands within the current property boundary. The management actions proposed in the Resource Management Alternatives, the Recreation Alternatives and the Preferred Alternative Options would result in minor, relative variations in their socio-economic impacts to the local and regional areas.

The Brule River State Forest contributes to the local and regional economy primarily in the areas of tourism and forest product generation. Wood product generation and tourism in this region and are largely compatible uses of the resource (Marcouiller and Mace 1999). Economic science cannot be accurately used at the scale of the local communities around the BRSF, however, a number of local business clearly benefit from the management of the state forest. The recreational opportunities offered on the forest attract users that use local motels, restaurants and other businesses. The timber harvest opportunities on the BRSF provide resources for local logging companies and associated businesses.

The management proposed in Resource Management Alternative 3 and Recreation Management Alternative B would continue to provide similar levels of timber products and recreational opportunities as provided under the current forest management. Therefore, these "no-action" Alternatives would not result in any local or regional socio-economic impacts.

The amount of socio-economic benefits provided by Resource Management Alternative 1 would be less than the current levels. Resource Alternative 1 would produce less forest products as the result of the application of "low impact practices and the "emphasis of aesthetic quality and ecological restoration". The reduction in the production of forest products proposed in Resource Alternative 1 would result in adverse impacts to local logging companies and associated businesses. The resulting impacts to the local forest-related tourism economy would be small but there would likely have been a decrease in hunters visiting the forest.

Resource Management Alternatives 3 and 4 progressively propose increases in the production of forest products, with Resource Management Alternative 4 being the highest. Correspondingly, the benefits to local logging companies and associated businesses would also increase. The impacts to the local, forest-related tourism would be small. However, there may have been an increase in the number of hunters visiting the BRSF and local businesses.

The amount of socio-economic benefits provided by Recreation Alternative A would be less than current levels. Recreation Alternative A would "provide limited recreational experiences centered on remoteness", with the overall recreational capacity of the forest reduced from current levels. The resulting impacts to the local forest-related tourism economy would be adverse due to the reduction in the forest's recreational capacity, which would logically correspond to a reduction in the number of forest visitors.

Recreation Alternatives 3 and 4 progressively propose increases in the recreational capacity of the forest by increasing the number and sized of facilities. Refer to the "Recreation Management Alternative- Comparison Table for additional information. Correspondingly, the benefits to local, forest-related tourism would also increase, but only to the point where the intensity of recreational use begins to degrade the resource and the quality of the recreational experience. The resulting impacts to the local logging companies and associated businesses would minimal.

Impacts resulting from the Preferred Alternative Options not selected are evaluated in the "Comparison and Evaluation of Management Options" included in that document following the Management Prescriptions for the Areas the included Options. Impacts to the local and regional products and forest-related tourism economy would be as follows. The Options that proposed to manage areas as Native Community Management Areas instead of Forest Production Areas would generally have minor adverse impacts on the forest products economy due to a relative reduction in the level of forest product production. The reduction is small in comparison with the amount of forest products produced in the region. Impacts to the forest-related tourism in the areas would be minimal.

The Options that proposed to manage areas as Habitat Management Areas instead of Native Community Management Areas generally would very slightly, but favorably impact the forest products economy by providing slightly more forest products through the maintenance of early successional forest habitats. The impacts to the forest-related tourism economy would be minimal. The impacts to the local, forest-related tourism would be small. However, there may have been an increase in the number of hunters visiting the BRSF and local businesses.

The Option that proposed to limit the number of users accessing the river through state owned lands would result in minor adverse impacts to the forest-related tourism economy. This would be a result of fewer visitors being able to access the river for paddling or fishing and a corresponding reduction in visitors frequenting local businesses.

Energy Consumption
The proposed Real Estate Management Alternatives, Resource Management Alternatives, Recreation Management Alternatives and Preferred Alternative Options, when compared to the current levels of energy consumption, would not generate a significant increase or decrease in energy consumption or production.

IMPACTS ON RESOURCES OF SPECIAL TRIBAL INTEREST

At the beginning of the BRSF Master Plan, a process was developed to consult, on matters affecting off-reservation treaty rights, on a government-to-government level with designated representatives from the Great lakes Indian Fish and Wildlife Commission (GLIFWC), who in-turn reported to and received direction from the Voigt Intertribal Task Force Representatives. These consultations were arranged as "round-table" meetings that were held at various key phases in the development of the Draft BRSF Master Plan. At each phase, representatives from

GLIFWC, members of the Voigt Intertribal Taskforce and any other interested tribal members were invited to comment.

Several of these round-table meetings focused on identifying resources, which in the opinion of the GLIFWC representatives and the participating WDNR staff members, are included under the Chippewa off-reservation treaty hunting, fishing and gathering rights. These resources will be referred to as "resources of special interest to the tribes". A series of tables were developed to evaluate the impacts to the "resources of special interest to the tribes" that would result from the various management actions proposed in the Resource Management Alternatives 1-4. A separate table was developed for each of the ecological landscapes that occur within the Brule River State Forest. These tables were developed in collaboration with GLIFWC's staff specialists as part of the government-to-government consultation process for the BRSF Master Plan.

Participating GLIFWC representatives included:
Jonathan Gilbert, Wildlife Section Leader
Karen Danielsen, Forest Ecologist

Participating WDNR representatives included:
Eric Epstein, Bureau of Endangered Resources
Greg Kessler, Wildlife Biologist
Dennis Pratt, Fishery Biologist
Dave Schulz, Forestry Specialist
Steve Petersen, BRSF Superintendent
Ken Brokaw, BRSF Master Plan, Planning Team Leader

These tables are included for reference in the Appendix. They provide key input into this evaluation the Resource Management Alternative's impacts to "resources of special interest to the tribes". Refer to Chapter Three for a full listing of and additional information regarding the resources of special interest to the tribes identified by the GLIFWC staff representing the Voigt Intertribal Task Force Representatives.

This evaluation of the impacts on "resources of special tribal interest" resulting from management actions contained in:

- The Real Estate Management Alternatives 1 & 2
- The Resource Management Alternatives 1 – 4
- The Recreation Management Alternatives A – D
- The Preferred Alternative- Options Not Selected

Real Estate Management Alternatives 1 and 2
Real Estate Management Alternative 1 proposes to maintain the current property boundary, therefore no impacts to resources of special tribal interest would result.

Real Estate Management Alternative 2 proposes to expand the current property boundary by adding about 44,000 acres to the state forest in three different areas. The expansion of the

property boundary proposed in Real Estate Alternative 2 is the same as in the Preferred Alternative and the Master Plan. Refer to the section of Chapter Two titled Real Estate Management for a detailed description of the proposed property boundary expansion areas. Refer to the section of Chapter Three titled "Impacts to Resources of Special Tribal Interest" for an evaluation of the resulting impacts.

The Resource Management Alternatives 1 – 4

Water Quality, Aquatic Habitat, Soil, Hydrology, Fish and Aquatic Species

Refer to the section of this chapter titled Impacts to Physical and Biological Resources, for a complete evaluation of the impacts to water quality, aquatic habitat, soil, hydrology, fish and other aquatic species. Impacts to "resources of special tribal interest" that occur in aquatic habitats, such as, wild rice, ducks, geese, beaver, otter, and fish would be impacted in the same way as other resources that occur in aquatic habitats, as described in that section. It was further noted that, "All Resource Management Alternatives, and the Preferred Alternative Options protect the wetlands and springs of the upper Brule River and tributaries so positive impacts would be expected for water quality and aquatic habitat. All Resource Management Alternatives in the sand soils would have continued to support natural hydrology and positive water quality impacts.

Terrestrial Vegetation and Wildlife

Refer to the section of this chapter titled Impacts to Physical and Biological Resources, for a complete evaluation of the impacts to terrestrial vegetation and wildlife. Impacts to "resources of special tribal interest" that occur in terrestrial habitats, such as, deer, bear, fisher bobcat, berries, firewood and balsam fir bows, would be impacted in the same way as other resources that occur in terrestrial habitats, as described in that section.

The Recreation Management Alternatives A – D

The Recreation Alternatives A-D would have little impact on the terrestrial vegetation and wildlife of the Lake Superior Clay Plain, the Brule River Ecosystem, the Bayfield Sand Plain or Mille Lacs Uplands ecological landscapes. Consequently, there would be minimal impacts to the "resources of special tribal interest" that occur in, or inhabit, these areas of the property.

One minor exception occurs under Alternative D, which proposes year round ATV trails. This would likely result in a minor increase erosion and impact vegetation within the trail footprint and would potentially disturb wildlife. Consequently, there would be a minor impact to the "resources of special tribal interest" that occur in, or inhabit, these areas of the property.

The Recreation Management Alternatives C and D propose to add more recreational developments that would result in minor adverse impacts to soil and storm water infiltration rates at the proposed project sites and secondarily to the water quality in aquatic habitats.

The Preferred Alternative- Options Not Selected

Impacts resulting from the Options included in the "Preferred Alternative" are evaluated in the "Comparison and Evaluation of Management Options" sections included in that document. Impacts to the "resources of special tribal interest" would be as follows.

The Options that proposed to manage areas as Forest Production Areas instead of Native Community Management Areas would generally have minor adverse impacts on the "resources of special tribal interest" due to an increased level of forest product production. The species included in the "resources of special tribal interest" that are commonly associated with early successional forest habitats would be positively impacted by these Options.

The Options that proposed to manage areas as Habitat Management Areas instead of Native Community Management Areas generally would favorably impact the "resources of special tribal interest" that are commonly associated with early successional forest habitats, through the maintenance of this type of habitat. These Options also involve some use of prescribed fire as a management tool. This is generally regarded as an action that favorable impacts "resources of special tribal interest".

The Preferred Alternative Option not selected, that proposed to limit the number of users accessing the river through state owned lands would result in minimal impacts to "resources of special tribal interest".

CHAPTER FIVE

BACKGROUND INFORMATION

This chapter was developed to serve as a reference tool for the reader other sections of this document or as a reference to other documents. The supporting or background information necessary to understand the management plan and environmental impact statement was largely incorporated into the appropriate chapters within this document.

PHYSICAL AND BIOLOGICAL ENVIRONMENT

Located in eastern Douglas County in far northwest Wisconsin, the Brule River State forest is approximately 30 miles north to south. It ranges from 6 miles wide at the south end, 2 miles wide for much of its length, and has 8 miles of frontage on Lake Superior. The 1979 master plan boundary includes approximately 50,000 acres of which 41,000 acres are in state ownership. The BRSF contains the entire 44 mile long Bois Brule River and 45% of its watershed. There is a total of 165 miles of stream length including 74 named and unnamed streams and there are five small lakes within the boundary.

The method used for organizing the ecological landscapes for the Brule River State Forest is based on the National Hierarchical Framework of Ecological Units (NHFEU). The NHFEU is an ecological classification system that divides landscapes into ecologically significant regions at multiple scales: Province, Section, and Subsection. Ecological types are classified and units are mapped based on the associations of biotic and environmental factors, which include climate, physical geography, water, soils, air, hydrology, and potential natural communities.

The Brule River State Forest and surrounding region are within Province 212, the Laurentian Mixed Forest (Bartelt et. al 1999). The finer ecological units of Section and Subsection are characterized by combinations of climate, geomorphic processes, topography, and stratigraphy. As illustrated in the map, *Ecological Features of Northwest Wisconsin*, include characteristics of three Subsections (Lake Superior Clay Plain, Mille Lacs Uplands and Bayfield Sand Plain) within the BRSF boundary. For the purposes of planning and because of the important features of the Brule River and its tributaries the Brule River Ecosystem was added as a fourth ecological area in this document. The resource capabilities of the BRSF are based on these four ecological landscapes, the Lake Superior Clay Plain, Mille Lacs Uplands, Bayfield Sand Plain and Brule River Ecosystem.

Land Resources
A summary of the condition and resource capabilities of these ecological landscapes is provided in Chapters Two and Three. Additional detailed information on the resource capabilities can be found in *Brule River State Forest Regional Analysis* (Brusoe et al. 2001), the *Regional Ecology Assessment* (Bartelt et al. 1999), the *Biotic Inventory and Analysis of the Brule River State Forest* (Epstein et al. 1999), and the *Community Restoration and Old Growth Assessment* (Eckstein et al. 2001).

Fisheries and Water Resources
The fish and water resources are an important part of the BRSF. The Condition and management of these resources is described in Area 4 and 5 of Chapter Two and in Chapter Three. Important information on the ecology and capabilities of the water resources within the BSRF is summarized in fact sheets located in Appendix E, the *Biotic Inventory and Analysis of the Brule River State Forest*, and the Lake Superior Water Quality Management Plan (WDNR 1999).

Endangered, Threatened and Species of Special Concern
These species are listed in the Appendix. Their presence on the BRSF and the impact of the management is described in Chapter Three. More detailed information can be found in the *Biotic Inventory and Analysis of the Brule River State Forest*.

EXISTING LOCAL AND REGIONAL RECREATIONAL RESOURCES

The local recreational resources within the current property boundary consist of the lands, physical features such as the river, and existing recreational facilities. The two primary recreational resources of the BRSF are the land itself and the river. The land provides over 40,000 acres of forest open to the public for hunting, hiking and wildlife viewing. The main branch of the Bois Brule provides 44 lineal miles of river available to paddlers and anglers.

Recreational opportunities provided by the BRSF include the following:

Canoeing, Kayaking, and Boating
Since the character of the Brule changes over its length, there is canoeing and kayaking suitable for people of little experience to those of extensive experience. There are rapids rated from Class I to Class IV. The BRSF offers 10 canoe landings along the Brule. Toilets are provided at Stones Bridge, Winneboujou, HWY 2, Copper Range, Pine Tree, HWY 13, and the Mouth of the Brule. Water is available at the campgrounds and HWY 2. For those who would prefer a lake on which to go boating, three lakes have public landings. Twenty-two acre Rush Lake is a “wild” lake that offers a carry-in boat landing and two small parking lots. The 1,913 acre Lake St. Croix can be accessed by using the concrete boat ramp at the St. Croix picnic area off of CTH A, located at the southern tip of the Brule Forest. Finally, 432 acre Lake Minnesuing can be accessed on the

sand/gravel public landing on the south west end of the lake. An estimated 42,000 canoeist, kayakers and boaters visit the Brule River annually.

Fishing

The Brule River State Forest has 20 fisherman parking lots to help accommodate the seasonally heavy fishing pressure that occurs on the Brule River and tributaries as well as provide access to Lake Superior, and the smaller lakes. There are 18 angler parking lots located along the Brule River that that are primarily used by steelhead anglers. Each of these lots is gravel surfaced and has a capacity from 3-10 vehicles. There are signs posted at the lots identifying them as "Fisherman Parking Lots" and many of them have river rules and fishing information posted at them. Information boards are provided at each parking lot. Un-maintained footpaths lead to various fishing areas on the river.

The Mouth of the Brule River Picnic Area and Boat Landing has parking for approximately 35 vehicles, a pit toilet, and three to five picnic tables. There is a wooden stairway to the beach from the picnic area. A small gravel boat landing is located on the Brule River and boats can pass from the river into Lake Superior or motor upriver for approximately one mile to the site of the old electric weir that was operated long ago to exclude Lamprey. The well in the picnic area has repeatedly failed to produce safe water and the pump has been removed.

The St. Croix Picnic Area and Boat landing is located off Highway A on the northeast corner of Lake St. Croix. This site provides a boat landing and pier, 3-10 picnic tables, pit toilets, and a flowing well. Parking is available for 10-15 vehicles and trailers. This site also serves as an access for the North Country Trail and the portion of that trail referred to as the Historic Portage Trail that traces the route of the early explorers as they portaged from the Bois Brule River to the St. Croix.

An estimated 33,000 angler visits are made to the waters of the Brule River State Forest annually.

Hunting

The Brule River State Forest has an extensive web of hunter walking trails for the upland bird hunter. There are over 40 miles of mowed hunter walking trails in the Brule Forest. Deer and grouse are the most commonly hunted species. Other hunting opportunities include woodcock, bear, and waterfowl. Trapping for species such as beaver, muskrat, fisher, otter, and mink is common. There are also numerous squirrel, rabbit, and snowshoe hare hunters.

The beaver ponds and created wetlands provide some of the few local opportunities to hunt good numbers of waterfowl on public lands in this area of Wisconsin. Ruffed grouse hunting has been very popular in recent years, where many grouse hunters make several visits a years. Bear hunter numbers have been especially high in the last several years because of permit availability with a large bear population. White-tailed deer populations are at high densities attracting large number of hunter for both bow and gun seasons. An estimated 40,000 hunter visits are made to the Brule River State Forest annually.

Camping

The Brule River State Forest has two family campgrounds. Each has a wheelchair accessible site. Bois Brule Campground has 23 primitive sites, while the Copper Range Campground has 17 primitive sites. Both campgrounds have pit toilets, a hand pump, picnic tables, benches, fire grates, and a canoe landing. Bois Brule Campground is located on Ranger Road south of HWY 2 in Brule. Adjacent to the campground is a picnic area and canoe landing. Copper Range Campground is located 4 miles north of Brule off of CTH H. It is located convenient to favorite fishing holes and canoe routes. A canoe landing is located a short walk from the campgrounds. Neither campground has electric hookups. There is no reservation system in effect for camping and site choice is "first come, first serve". Camping for backpackers and during gun deer season is allowed by written permit at no charge. Estimated 9,700 camping visits are made to the state forest annually.

Picnicking

There are three picnic areas in the Brule River State Forest. The one at the mouth of the Brule overlooks Lake Superior; another is adjacent to Bois Brule Campground; a third is on Lake St. Croix. Each picnic area has grills, picnic tables, and pit toilets. A single picnic table and grill is also provided at the Stone's Bridge canoe landing for users of the facility. An estimated 5,000 people utilize BRSF picnic facilities annually.

Hiking

There are four hiking opportunities on the Forest. Stoney Hill Nature Trail is a 1.7-mile self guided nature trail that begins and ends near the Bois Brule Campground. This trail features interpretive signs and a scenic view of the Brule River valley. The Historic Bayfield Road Hiking Trail is 2.2 miles long with a natural soil base. It is located off Clevedon Road about three miles north of HWY 2 and provides parking for 6 vehicles. This trail follows the route of an 1800s stagecoach road and features 19th century copper mine shafts. The trail is popular for snowshoeing in the winter. The historic Brule-St. Croix Portage Trail is near the St. Croix picnic area on CTH A. The 1.9-mile trail was used first by natives and then explorers, fur traders, trappers, and missionaries as early as the 1600s. The trail is on the Wisconsin list of historic places. There is a historical marker on CTH A about ¼ mile from the intersection with CTH P.

One 15 mile segment of the 2,600 mile long North Country National Scenic Trial has been constructed between CTH A and CTH S along the east side of the Brule River valley, overlapping a portion of the historic St. Croix-Brule Portage Trail. A gravel parking lot accommodates 12 vehicles. Additional segments of the North Country National Scenic Trail will be constructed in the future. An estimated 3000 hikers use the trail of the Brule River State Forest annually.

Snowmobiling and ATVs

There are three snowmobile/winter ATV trails on the Brule River State Forest. The Brule-St. Croix Trail is 26 miles long and connects with other Bayfield and Douglas County Trails.

Trailheads are at the St. Croix picnic area, and south of Brule on STH 27. Parking for about 20 vehicles is provided in a lot about ¾ mile south of HWY 2 and HWY 27. A snowmobile club trail connecting northern Bayfield County and the Tri County Recreational Trail. This trail is operated under a land use agreement on the 4.5 miles lying within the Brule Forest boundary. The Tri-County Corridor that connects the City of Superior to the City of Ashland. It parallels the north side of HWY 2, passing through the BRSF, though not on state forest property, impacting as a connector trail.

An estimated 19,000 snowmobiling trips occur on these trails in the state forest annually. All terrain vehicles are allowed on the Tri-County Corridor year around. The Brule-St. Croix Snowmobile Trail is open to ATVs during the months that it is open to snowmobiling. ATVs are prohibited on all other state owned land on the Brule River State Forest.

Swimming

There are no designated beaches in the BRSF. However, some enjoy swimming at Rush Lake and St. Croix Lake. Others brave the cold water of Lake Superior, and swim near the mouth of the Brule picnic area. There are days where over 200 people visit the sandy shoreline of Lake Superior near the mouth.

Wildlife Viewing

The Brule River State Forest has an extensive web of hunter walking trails. There are over 40 miles of mowed walking trails in the Brule Forest where a variety of wildlife species can be observed. Those who wish to see wildlife species that inhabit riparian communities can do so by canoeing down the Bois Brule River. A wildlife viewing area exists on HWY 13near the Cloverland Community Club. For those interested, a bird watching guide to the BRSF is available at the BRSF Headquarters.

Cross-country Skiing

The After Hours Ski Trail is about 14 miles long and is groomed for both classical skiers and skate skiers. The trail is made up of four connecting loops that enable the skier to ski different distances. There is a warming shelter at the trailhead that is jointly maintained by a local ski club in partnership with the Department of Natural Resources. A 75 vehicle parking lot is provided. Such events like a 12/24-kilometer ski race, and candle light ski occur at the trail every year. An estimated 12,000 skiing visits to the After Hours Ski Trail occur annually.

Biking

The Brule River State Forest has no designated trails for biking, however the Tri-County Corridoridor is commonly used for biking. Cyclists who enjoy getting away from the crowd may use any of the marked hunting walking trails or the snowmobile trail. Town and county roads that pass through the forest are lightly traveled and offer cyclists scenic riding. Biking numbers have been increasing in the last few years. An estimated 400 visits are made by cyclists annually.

Horseback Riding

Horses are allowed on undeveloped areas in the state forest. There are no developed horse trails, but a few riders enjoy remote roads within the BRSF. An estimated 80 visits by horseback riders were made on the Brule River State Forest trails in 1997.

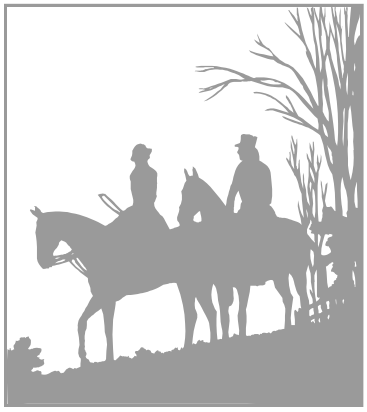
Other Recreational Uses / Activities

Berry picking, mushroom hunting, and sight seeing are among other common activities on the Brule River State Forest.

The existing regional recreational resources are described in detail in the *Recreational Supply and Demand – Northern Forest Assessment* (Watkins, et al., 2001). According to this Assessment, the Brule River State Forest provides less than 1% of the campsites, trails and two percent of the hunting land in the region. In the regional context, the BRSF play a minor but more important role in providing opportunities for recreational activities such as cross-county skiing, and fishing canoeing and kayaking.

Cultural Resources

The existing cultural and historical resources are described in the appropriate section of Chapter Three. The reference source for this information is the Archeological Site Inventory maintained by the State Historical Society of Wisconsin.



EXECUTIVE SUMMARY OF THE BRSF REGIONAL ANALYSIS

Results from the Brule River State Forest Regional Analysis, a requirement of the Department's master planning process, indicate the Brule River State Forest is important to northwest Wisconsin in two respects: for its contributions to increasing the region's ecological diversity and for the high-quality recreation opportunities it affords.

Located in Douglas County, the Brule River State Forest is Wisconsin's first state forest. To date, the long, narrow BRSF, much of it only two miles wide, includes approximately 40,000 acres and contains the entire 44-mile length of the Bois Brule River. The region for the Brule River State Forest is defined by Douglas, Bayfield, Sawyer, Washburn and Burnett Counties. Within the region, the Brule River State Forest contributes potential for the following ecological management opportunities:

- **Bois Brule River system**. The entire mainstem of the high-quality river lies within the BRSF boundary, which affords a unique opportunity for the protection and management of a river this size, a large portion of its watershed, and the associated natural processes, communities, and species.

- **Brule Spillway Macrosite**. An extensive natural site that contains exemplary stands of several important natural communities, aquatic features, and a concentration of rare plants and animals. This site is of regional and statewide significance.

- **Lake Superior Clay Plain**. Potential to restore several large stands of boreal forest, a community type now rare in Wisconsin. The Brule River State Forest contains the largest acreage of state-owned lands suitable for the restoration and management of boreal forest.

- **Bayfield Sand Plains**. An opportunity to restore components of the pine barrens community. In the case of both the boreal forest and barrens restoration, large-scale management is possible in conjunction with large blocks of neighboring industrial forest lands.

The Brule River State Forest is also important regionally for the high-quality recreation opportunities it affords:

- The Bois Brule River is the premier trout fishery in the region, attracting anglers from across the state and beyond.

- The upper and lower stretches of the Bois Brule River combine to offer scenic canoeing and kayaking opportunities ranging from Class I to Class III (high water) that are not comparable to any other in the region.

- The forest-based recreation opportunities include quality deer and grouse habitat, and the locally popular After Hours cross-country skiing trail.

Please refer to the *Brule River State Forest Regional Analysis* (Brusoe et al. 2001) for a complete discussion of the economic, ecological and social conditions, opportunities, and constraints associated with the property on a local and regional scale.

LAND OWNERSHIP AND USE WITHIN AND ADJACENT TO THE BRSF

The current state forest project boundary is approximately 50,000 acres with 41,000 acres is state ownership. The boundary expansion adds an additional 32,000 acres divided between two large areas. All of the land in the expansion areas is currently in private ownership. A description of the land and land use within the current and state forest project boundaries is presented in Chapter Three.

Descriptions of the ecological condition and land use within the region surrounding the BRSF are provided for each ecological landscape within Chapter Two, the *Regional Analysis* (Brusoe et al. 1999) and the *Regional Ecology Assessement* (Bartelt et al. 1999).

History of the Brule River State Forest

General History

The Bois Brule River valley and the uppermost St. Croix River valley were carved by meltwater flowing south from glacial Lake Superior and the surrounding uplands. When the glaciers receded, a divide was formed out of which the Brule and St. Croix Rivers flow today in opposite directions. A portage was established between these two rivers, connecting Lake Superior and the Mississippi River watersheds. It was used by early native people and later by European explorers, traders, trappers and missionaries.

Early historical evidence indicates that natural and man-caused fire had a significant impact on the area. The Brule area began to be recognized as a recreational resource in the mid 1800s. Cutting of the pine forests began in the 1890s. Logging dams and log drives had severe impacts on the river during that period of exploitive logging. The exploitation was followed by wildfire and burning to clear the land for agricultural purposes. In the 1930s, most attempts at agriculture were abandoned, and a fledgling forestry program was in place. The Civilian Conservation Corps camp at Brule assisted in early fire control and reforestation efforts from 1933 to 1942.

The Brule River State Forest began with a gift of land from Frederick Weyerhauser's Nebagamon Lumber Company in 1907. Today, the state forest contains the entire length of the Bois Brule River. The river is spring fed and runs cold and clear with a steady flow. The river falls 420 feet from its source to Lake Superior, resulting in numerous rapids and ledges. These attributes help give the Brule it's reputation as an excellent coldwater fishery and canoeing stream. The BRSF is visited by over 120,000 recreationists annually. Famous visitors include 5 men who were U.S. presidents: Ulysses Grant, Grover Cleveland, Calvin Coolidge, Herbert Hoover and Dwight Eisenhower.

It was not until the late 1950s that a full-time manager was assigned to the Brule River State Forest and a sustained yield forestry program and recreation facilities began to be developed. The first Forest staff was stationed at the former Gordon State forest nursery. In 1963, the staff was moved to quarters in the Brule Ranger Station. The Boundaries of the state forest were changed over time. Some significant changes were made in 1959, when the boundary was extended to include Lake Minnesuing on the southwest and the river corridor north of HWY 2to Lake Superior. In 1979, several miles of Lake Superior shoreline were added to the BRSF.

Management History

Historic events that have impacted the Brule River State Forest (BRSF) are important to understand when considering condition of current forest cover, current forest management, and potential future forest covertype conditions.

Prior to the late 1800s the forest covertype disturbance was primarily from natural forces of weather and fire with very little human influenced disturbance. One exception was in the "barrens" in the southeastern part of the BRSF where Native Americans used fire to manage blueberry crops.

Around 1890, logging of pine began in the Brule valley. Harvesting was done for the purpose of producing lumber and was conducted with little consideration of contemporary or future impacts to the resource. By 1909, most of the "virgin" timber was logged from the watershed with the exception of the upper river valley where older pine stands and the cedar bog received limited harvest. Other than small scattered stands, much of the landscape was deforested. The cut over landscape allowed rapid runoff contributing to flooding of the river.

Another major impact to the land was uncontrolled wildfire. With a large volume of logging slash and increasing activity of humans in the valley, wildfires were frequent and their impacts even more damaging than the unmanaged harvesting of the 1890s. Wild fire touched just about every acre of what is currently the BRSF during the period of 1890 - 1935. These fires along with increased agricultural use set the stage for the condition of the forest.

With the establishment of the BRSF in 1932, it was obvious what the first land management needs would be; first was to protect the land from fire and second was to reforest the land. Camp Brule Civilian Conservation Corps was a prime labor source for both these efforts from 1933

through 1942. Massive coniferous plantings of primarily jack pine were established, not always successfully, on abandoned agricultural fields and burned over areas in the sand country.

Natural regeneration of seed origin aspen after fire disturbance took place over much of the western, central, and northern areas of the BRSF. Other tree species associated with the aspen that regenerated well with fire disturbance were white birch and red oak on the sandier soil types. Where seed trees had escaped fire, fir readily regenerated on the loamy and clay textured soils in the central and northern portions of the BRSF. Large scale planting efforts of jack and red pine continued well into the early 1970s. These planted and naturally regenerated second growth forest covertypes created the future forest management opportunities. Up until the mid 1940s there was very little managed forest harvesting done, most of the reported harvest volume from 1910 to 1940 was due to salvage of wind and fire damaged trees.

Annual allowable cut (ACC) is a forestry term for the degree of harvest that is necessary annually to result in the specific goals of a sustainable forest. The area in this calculated for this annual work is based on the ecological conditions and specific management goals for various tracts of the BRSF. The first AAC for BRSF was based on harvestable volume and was set at 500 cords per year starting in the 1940s. In 1960, forest reconnaissance mapping was instituted on state and county forests, including BRSF, and enabled forest managers to calculate AAC based on acreage of the major forest covertypes. Utilizing continually updated forest reconnaissance data to periodically recalculate AAC produces a forest management schedule that is responsive to changes on the BRSF. Acres of a particular forest type, say aspen or jack pine, divided by age at economic or biological rotation for that type = AAC. As acres increase or decrease, AAC increases or decreases correspondingly. Some major causes of variation of AAC on the BRSF have been:

- Increases in forest acreage through land acquisition, resulting in a proportionate increase in the forest type acquired.

- Designation to remove clay slopes from current harvest schedule to discourage regeneration of aspen as a method to reduce slump bank erosion rates resulted in a loss of about 2000 acres to the acreage base used for calculating AAC.

- Designation and removal of the upper river spring areas from conventional harvest consideration resulted in an additional 1000 acres loss to the acreage base used for AAC.

- Acreage of special use areas such as Natural Areas and Aesthetic Zones where timber harvest is reduced based on the site goals.

- Changes in primary stand types as the result of forest succession; for example, a stand that converts from aspen to balsam fir results in loss of that acreage to aspen type AAC and gain to the balsam fir type AAC.

Between the years 1983 and 1997, the average acreage harvested and/or thinned has been 440 acres per year. The allowable cut (AAC) based upon forest reconnaissance data has averaged

1450 acres per year of harvest and thinning for this same time period. Approximately 1000 acres of the AAC per year has not been harvested or thinned. Reasons for not completing a harvest or thinning operation at this time include lack of BRSF staff time to complete the operation, the stand not being ready for harvest or thinning at the time, and deciding to manage for goals which require lower harvest levels.

Ecological Potential
Since the early 80s, BRSF forest management has included an additional element of interpretation of the landscape. Ecological potential information is used in conjunction with the forest reconnaissance to help plan sound integrated land management practices. This planning is not limited to forest cover management but also includes recreation, wildlife, fisheries, and watershed management.

The USFS Ecological Classification System (ECS) in combination with WDNR Habitat Classification System have been the primary systems used to ecologically classify the BRSF land base. Utilizing this ecological information over the past 20 years has allowed the land managers to have a better understanding of how past disturbance influenced current forest conditions and better predict the result of current land management activities.

Trends
Second growth stands are progressively exhibiting greater diversity in tree species, due primarily to the control of wildfire. These stands in general are moving into later forest succession. The rate of advancement in forest succession depends on ecological potential and natural or man-caused impacts on the stand.

Continual updating of forest reconnaissance information in conjunction with ecological interpretations of the land base will assist the land managers in developing land management plans. With time, harvest strategies will change with the continued movement of much of the forest covertypes to later forest successional species. With continued and improved forest management techniques the health of the BRSF landscape will continue to improve while providing the benefits of an integrated land management philosophy.

Current Levels of Forest Management Activities
Timber sales – varies- approximately 10 per year
Clearcuts – varies-approximately 5 for 100 acres
Plantation thinning - varies-approximately 5 for 200 acres
Balsam bough permits - varies 15 in 1997
Individual Christmas tree permits - varies - 160 in 1997
Pruning - approximately 20 acres of red pine plantation per year over past 20 years
Tree planting - approximately 60 acres per year over the past 20 years
Site preparation for natural seeding - approximately 30 acres per year for past 5 years

STATE FOREST OPERATIONAL COSTS AND REVENUE

The current permanent staffing on the state forest includes a superintendent, a forester and a recreation ranger. This level of staffing has not changed since the 1950s. In addition, limited term and contract staff are used to address additional work load. The current operational costs to support facility maintenance and development, recreation maintenance, law enforcement and forest management on the state forest are as follows:

Salaries and fringe - $185,000
Limited Term Employees - $55,000
Supplies and Services - $90,000
Total - $330,000
About $20,000 of this goes to support the total forestry operations by funding operations of the Brule office which also supports other Department functions.

Revenue on the state forest is generated from two primary sources; timber sales and recreational fees with timber sales representing most of the revenue by far. There are annual fluctuations in state forest revenue based on management objectives, weather, and market conditions. Revenue from timber sales has averaged around $300,000 per year over the last several years making up over 90% of the property income while recreation revenue (from camping and trail fees) has averaged about $30,000 per year. All state forest revenue is deposited into the statewide forestry account all with other sources of forestry program funding. Funds from this and other state accounts are appropriated by the state legislature and the Governor in the biennial budget.

CHAPTER SIX

SUMMARY OF MASTER PLAN PUBLIC INVOLVEMENT AND COMMENTS

PUBLIC INVOLVEMENT

In accordance with Administrative Code NR 44 – Master Planning for Department Properties, Wisconsin State Statute 28.04 – Management of State Forests, the Brule River State Forest embarked on a plan to involve the public in the process of developing a revised master plan for the Brule River State Forest. From its beginning, steps were taken to ensure there were opportunities for public involvement throughout the planning process.

At the outset of public involvement the Department developed an extensive public involvement plan and distributed it for public review and comment. This publication described purposes for public involvement, identified stages of the planning process and listed opportunities for public participation.

METHODS OF PUBLIC CONTACT

The planning process emphasized the use of direct mail and face to face meetings of discussion and working groups. People were informed via state-wide new releases, direct mailings of meeting announcements and progress reports, public meetings, a forest tour, email, website, letter responses, and personal or telephone contacts.

The Department involved local governments and tribal contacts. Consultation with the tribes is conducted on a government to government basis as required under Wisconsin Administrative Code NR 44.04 (7)(c).

The Wisconsin DNR Internet web site, http://www.dnr.state.wi.us/master_planning/ included master planning pages. This site incorporates nearly all documentation produced on the plan, making it readily available to anyone with Internet access. The following information can be found on the site:

- A map of the forest
- A description of master planning.
- Supporting documents including fact sheets, regional assessments, the Brule Biotic Inventory, and a down-loadable literature order form.
- Planning Progress Reports and other updates.
- Meeting announcements, media archives and contacts for submitting comments or signing on to the mailing list by email.

- All mailings and publications provide phone and addresses for master planning staff, so the public can order published documents or get on the mailing list.

PRIMARY STAKEHOLDERS IN THE PLANNING PROCESS

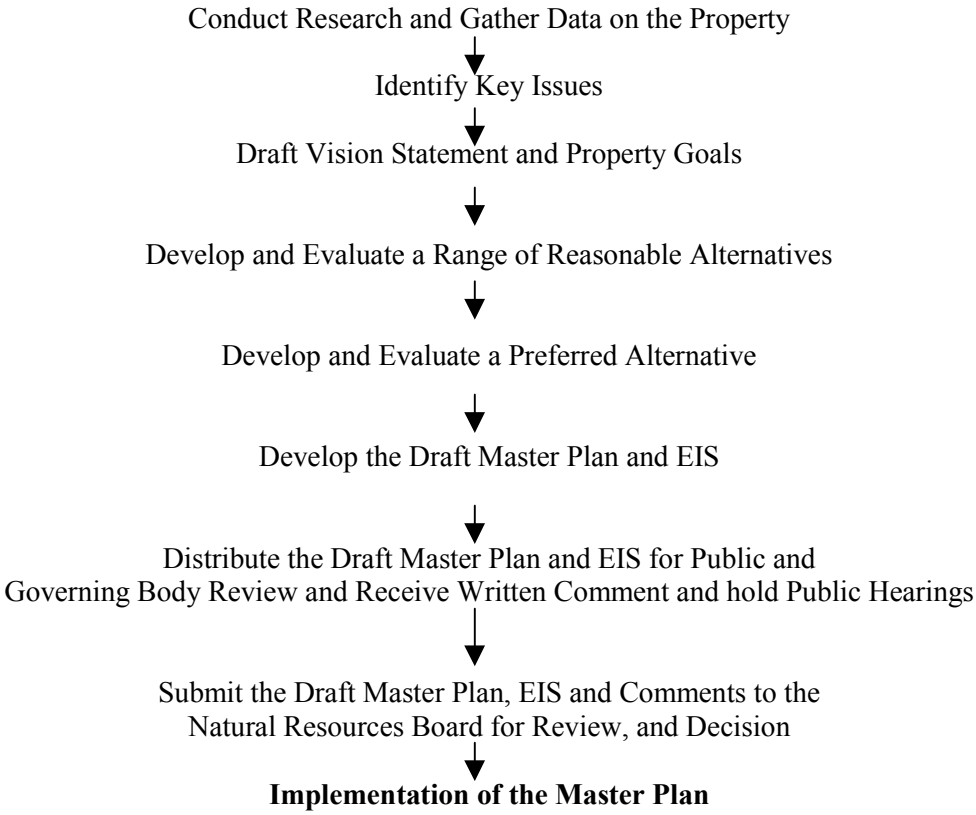
Participation and in master planning involved people of varied interests and backgrounds. Some of these "stakeholders" in the future of the Brule River State Forest include: local property owners, and interest groups, local and regional elected officials, tribal representatives, motorized recreation groups, environmental organizations, canoe/kayakers, hunting /fishing groups, local loggers, the timber products industry, and local businesses.

PUBLIC INVOLVEMENT METHODS

A variety of techniques were used to provide ways for people to participate in the planning process. These included: open house meetings and a site tour, public listening sessions, a direct mail list, an issues opinionnaire, regular progress reports and announcements, public informational forums and workshops, a web page for remote review, an Internet list server and distribution list, government to government consultation, press releases and media interviews, development of public educational materials, and group presentations. The Progress Report mailing list has been about 1,000 people for the last couple of years. The DNR's Brule River State Forest Master Planning website has been popular with 100s of hits each month. Local and public meetings have generally drawn about 50 people. Informational presentations, provided to groups by request, provided overviews of the master plan's purpose, discussed opportunities and methods for public involvement, identified primary stakeholders and described key issues and alternatives.

THE MASTER PLANNING PROCESS

The following diagram depicts the planning process and points where participation from the public and governing bodies occurs during the phases leading up to drafting of a complete master plan:



ISSUE IDENTIFICATION

Early in the process, an opinionaire survey and open house/forest tour were used to identify important issues to consider in planning and the EIS. The opinionaire and open house meeting clearly indicated that the respondents believe that the Brule River and the Brule River State Forest are special resources that deserve special management and protection. The results also confirmed that the issues previously identified remain important today, and that there is a wide range of opinions on almost every issue. A complete summary of the issues identified is contained in the *Brule River State Forest Master Plan Progress Report, Volume 2.* Over 70% of the respondents felt the following issues were "very important":

- composition of the BRSF, the amount, condition and location of various forest types
- amount, size, location and methods of timber harvest on the BRSF
- water quality impacts to the Brule River

BACKGROUND RESEARCH AND PUBLICATIONS

Information to support the planning process was compiled and made available to the public on a variety of topics. These documents were available in paper copy and on the DNR's Internet site and included the following:

Shaping the Future, Master Planning for Wisconsin's Northern State Forests
This booklet provides an overview of master planning. Guiding principles and the role of citizens in the planning process is discussed. The document describes master planning as a participatory process using the best information available to arrive at final decisions.

Northern Forest Assessments
DNR scientists and collaborators produced a series of assessments to document their inventory and analysis of the forest. Ten different publications address the following topics: Biodiversity, Monitoring and Evaluation, Regional Ecology, Biotic Inventory and Analysis of the Brule River State Forest, Socio-Economics in Northwest WI, Sustainable Forestry, Environmental Education and Awareness, Recreational Supply and Demand, Community Restoration and Old Growth, Regional Analysis for the BRSF. Executive summaries were also available.

BRSF Master Plan - Fact Sheets
Throughout the planning process nineteen fact sheets were developed. These one or two page educational documents discuss a variety of issue related topics ranging from "Aesthetic Management" to "Wildlife". These were based on years of monitoring and experience by DNR staff working in and around the BRSF.

BRSF Master Plan - Progress Reports
During the time span leading up the draft master plan eleven progress reports were published. The purpose of these informational publications was to keep the public informed and to announce citizen involvement opportunities. Articles published in the reports included: announcements of events and calendar schedules, time lines, discussions of key issues, summaries of public comments and tribal consultations, answers to frequently asked questions, and literature order forms. At some stages in the process key planning documents accompanied the progress report.

Draft Planning Documents:
Several working draft documents were introduced or developed with involvement from the public as the plan's focus narrowed toward completion. These included a public involvement plan, draft vision and goals statements, draft master plan alternatives, the preferred alternative, and the draft master plan. These were presented to participants in public meetings, mailings, and on the master planning website.

INFORMATION FORUMS

A series of public informational forums / workshops were held to lay the groundwork for developing the master plan alternatives. At each of the Issue Forums DNR scientists presented information about the BRSF and its resources and recreational uses. There also was an opportunity for the public to provide additional information and discussion on the topic. The forums featured the following topics:

Forest Ecology and Management:
Forest Management Techniques, Forest Cover / Vegetation Types, Regional Ecology, Community Restoration Opportunities, Wildlife, Scenic Quality

Recreation
Camping, Motorized Recreation, User Conflicts, Trails, Hunting / Fishing, Boating

Water Resources and Socio-Economics
Water Quality, Watershed / Hydrology, Shoreline Habitat, Fisheries, River Access, Economics of the State Forest, Local and Regional Socio-Economics.

PUBLIC COMMENTS AND THE DECISION MAKING PROCESS

Throughout the planning process Department staff have recorded the public's comments in a computer database. A summary of public comments was produced following public review of each stage in the master plan development. The Department's analysis and summary of comments is intended to be qualitative rather than quantitative, although the general level of comment on a topic is noted. That is, it does not try to tally the number of comments concerning a particular issue. The Summary of Comments simply attempts to describe what we heard collectively and reports that information back to all of our public participants.

In developing the new plan the Department carefully considered the input received from the public, tribal representatives and other governing bodies along with the technical input of the DNR's interdisciplinary team of scientists. Other considerations include the statutory purpose of a state forest, the Draft Vision Statement and Property Goals, information contained in the Northern Forest Assessments, the Biotic Inventory, the Regional Analysis and other available data.

THE TRIBAL CONSULTATION PROCESS

At the beginning of the BRSF master planning effort, a process was developed to consult, on matters affecting off-reservation treaty rights, on a government-to-government level with designated representatives from the Great lakes Indian Fish and Wildlife Commission (GLIFWC), who in-turn reported to and received direction from the Voigt Commission. These consultations were arranged as "round-table" meetings that were held at various key phases in the development of the Draft BRSF Master Plan. In some cases comments were written, reviewed and approved by members of the Voigt Commission, and submitted the DNR in letter form. Several round-table consultations focused on identifying resources, included under the Chippewa off-reservation treaty rights, and therefore of special interest to the tribes and evaluating the potential impacts of various possible management actions on those resources. The tribal consultation process provides the opportunity for government-to-government consultations between each of the stages of the master plan's development, described above in THE MASTER PLANNING PROCESS. At each phase, representatives from GLIFWC and any other interested tribal members were invited to comment on the developing master plan document.

Chronological Summary of Public Involvement Activities for the Brule River State Forest	
1997	
05/97	News release announcing intent to revise BRSF Master Plan
12/97	Tribal:Forest superintendent gave notice of master plan start up to Bad River tribe.
1998	
01/98	Public announcement of master plan to statewide newspapers, Outdoor Report
01/98	Master plan brochures mailed to tribes and interested and affected parties.
01/98	Internet web site established.
01/98	Tribal: Established contact with head of tribal natural resources department.
01/98	Tribal: Superintendent spoke with GLIFWC.
03/98	Forest staff have master plan information booth at sports show.
03/98	Tribal: Forest staff met with GLIFWC and NHAL planning staff.
04/98	Progress report #1 mailed.
05/98	Forest staff met with Brule Valley Ski Club.
05/98	Tribal: Brule and NHAL staff met with GLIFWC and tribal representatives.
06/98	Informational open house and forest tour.
06/98	Tribal: Brule and NHAL staff met with GLIFWC and tribal representatives.
08/98	Progress report #2.
09/98	Tribal: Brule and NHAL staff met with GLIFWC and tribal representatives.
10/98	Vision & Goals meeting.
10/98	Tribal: BRSF staff provided tour of the forest to Danielsen and O'claire.
10/98	Tribal: Brule and NHAL staff met with GLIFWC and tribal representatives.
11/98	Tribal: Brule and NHAL staff met with GLIFWC and tribal representatives.
12/98	Progress report #3.
12/98	Tribal: Brule and NHAL staff met with tribal representatives.
1999	
01/99	Tribal: Brule and NHAL staff met with tribal representatives.
04/99	Progress report #4.
05/99	Progress report #5.
06/99	Forest Ecology & Management issue forum.
08/99	Progress report #6.
08/99	Tribal: BRSF staff met with GLIFWC.
10/99	Tribal: DNR /GLIFWC meeting to evaluate potential impacts /treaty rights.
11/99	Tribal: Met with tribes regarding the status of master plans.
12/99	Forest Recreation and Wildlife Management issue forum.
12/99	Water Resource Management and Socio-Economic issue forum.
2000	
03/00	Progress report #7.
05/00	Progress report #8.
06/00	1 st Alternative Concepts public workshop.
08/00	2 nd Alternative Concepts public workshop.
08/00	3 rd Alternative Concepts public workshop.
08/00	4 th Alternative Concepts public workshop.
08/00	5 th Alternative Concepts public workshop.
12/00	Progress report #9.

Chronological Summary of Public Involvement Activities for the Brule River State Forest	
2001	
01/01	Superintendent spoke with Brule River Sportsmen's Club
03/01	Public meeting to update Brule area about master plan progress.
04/01	Superintendent addressed Loggers' Congress about master plan.
09/01	Tribal: Superintendent met with Fratt for Red Cliff Tribe.
09/01	Tribal: Superintendent met with Bigboy chair of Bad River tribe and Doolittle.
09/01	Tribal: Superintendent met with DePerry of Red Cliff tribe.
10/01	Progress report #10.
11/01	Open house meeting for Preferred Alternative.
2002	
02/02	Progress report #11.
02/02	Tribal: DNR staff and scientists met with Danielsen of GLIFWC in Odanah.
08/02	Progress report # 12.
08/02	Release of draft Master Plan /Eis for public review.
09/02	Public Hearings: Poplar (Brule), and Fitchburg (Madison)
09/02	Cross examination of DNR experts during public hearing, Fitchburg, WI.
10/02	Progress report #13.
10/02	Public informational meeting, Brule, WI.
11/02	Progress report #14.
12/02	Presentation of Master Plan /EIS to the Natural Resources Board. Approved by NRB.

Appendix

Appendix A: *Glossary of Terms*

Aesthetics: A pleasing appearance or effect. Source: Webster's 10th New Collegiate Dictionary. 1993.

Biological Diversity: The variety and abundance of species, their genetic composition, and the communities, ecosystems and landscapes in which they occur. Biological diversity also refers to the variety of ecological structures, functions and processes at any of these levels. Source: Wisconsin Statute 28.04(a) - Public Forests.

Clearcutting: A regeneration or harvest method in which the majority of trees are harvested from an area at one time, often followed by seeding or tree planting to create a new, even-aged stand of trees.

Cultural Resource: "Any archeological, architectural or historical artifact, site or structure that reflects on the human-made environment." Source: Wisconsin Administrative Code, Department of Natural Resources, Chapter NR 44.03

Diversity (or biodiversity): "The variety and abundance of species, their genetic composition, and the communities, ecosystems and landscapes in which they occur. Biological diversity also refers to the variety of ecological structures, functions and processes at any of these levels." Source: Wisconsin Statute 28.04(a) - Public Forests.

Ecological Capability: The potential of an area to support or develop one or more communities with the potential being dependent on the area's abiotic attributes, its flora and fauna, its ecological processes and disturbances within and upon the area. Source: Wisconsin Administrative Code, Department of Natural Resources, Chapter NR 44.03.

Federally Endangered Species: Any species which is in danger of extinction throughout all or a significant portion of its range other than species of the Class Insecta determined by the Secretary to constitute a pest whose protection under the provisions of the Endangered Species Act would present an overwhelming and overriding risk to man.

Federally Threatened Species: Any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Group campsite: Any campsite authorized for use by groups other than those meeting the definition of a camping party in a family campground as defined by Ch. NR 45.

Information facilities: Signs, sign boards, information kiosks and visitor centers for the purpose of providing use or educational formation to the public.

Integrated Ecosystem Management: "A system to assess, conserve, protect and restore the composition, structure, and function of ecosystems to ensure their sustainability across a range of temporal and spatial scales and to provide desired ecological conditions, economic products, and social benefits." Source: May 1995 Wisconsin's Biodiversity as a Management Issue publication.

Management Objective: The desired future condition of the land. Management objectives are goals that may relate to forest communities, aesthetic conditions, wildlife, or recreation, among other topics.

Management Prescriptions: Directions outlining specific activities that are planned to achieve the stated objectives.

Motorized use: People traveling by use of a motor powered vehicle other than when engaged in management activities or contract operations authorized by the department.

Native surface material: Unprocessed, indigenous road and trail surfacing material.

National Hierarchical Framework of Ecological Units (NHFEU): An ecological classification system that provides information about ecological resources at different scales, from regional to local.

Natural-appearing: Visually perceived as minimally altered or modified by human actions.

Non-motorized use: Transportation of people by any means other than by a motor-powered vehicle, such as walking, paddling, skiing, etc.

Primitive surface material: the natural soil, rock or sand surface existing on roads and trails that developed through use and was not constructed.

Renewable Forest Products: Renewable forest products are elements of a forest that can be produced over and over again using sustainable forest management practices, such as saw timber, pulp wood, firewood, berries, and boughs.

Restoration: In the context of this document "restoration" means to increase or return species, structures, and processes that are currently diminished locally, regionally, or statewide, to locations on the property that have high capability/potential for both accommodating and sustaining these currently scarce resources. It would attempt to include missing successional stages and patch sizes. Or, to simply to return forest cover to presently deforested areas.

Rotation: Period of years between harvests. This varies by species and management objective.

Seed Tree Cutting: Leaving a residual of scattered trees after cutting to provide a seed source for regeneration.

Selection Cutting: The removal of selected trees throughout the range of merchantable sizes at regular intervals, either singly or in small groups, leaving a uniformly distributed stocking of desirable trees and size classes. (NR 37.03)

Shelterwood Cutting: A partial removal of mature trees leaving trees of desirable species and form to provide shade, seed source and a desirable seed bed for natural regeneration, followed by a final removal of the overstory after adequate regeneration is established (NR 37.03).

Silviculture: The art, science, and practice of establishing, tending, and reproducing forest stands with desired characteristics.

Single unit campsite: A campsite designated for use by families or groups of 6 persons or less.

Succession: Replacement of one plant community by another. An example is the succession from shade intolerant to tolerant plant species.

Sustainable Forestry: "The practice of managing dynamic forest ecosystems to provide ecological, economic, social and cultural benefits for present and future generations." Source: Wisconsin Administrative Code, Department of Natural Resources, Chapter NR 44.03

Thinning: Cutting made in a timber stand to increase the rate of growth and to improve composition of the remaining stand. Thinnings are intermediate cuttings that control the growth of stands by adjusting stand density.

Visitor controls: Regulatory signs, access barriers and regulations, for directing or controlling the behavior of people using department-managed lands.

Wisconsin Species of Concern: Those species about which some problem of abundance or distribution is suspected by not yet proved. The main purpose of this category is to focus attention on certain species before they become threatened or endangered.

Wisconsin Threatened Species: Any species which appears likely, within the foreseeable future, on the basis of scientific evidence to become endangered.

Wisconsin Endangered Species: Any species whose continued existence as a viable component of this state's wild animals or wild plants is determined by the Department of Natural Resources (DNR) to be in jeopardy on the basis of scientific evidence.

Appendix B: *Bankfull Flow Fact Sheet*

Changes in vegetation cover from forestland to farmland (or young forests, <16 years old) will cause snow to melt faster and will cause rainfall to reach streams faster. The changes in vegetation cover do not affect the peak flow of large floods; say in the 25- to 100-year flood range. However, they do affect the smaller peak flows. Most importantly, they affect the every year peak flow.

Hydrologists call this flow the dominant flow or the bankfull flow because it is recognized as the flow when the channel is just filled to the bank top; it is just ready to start flooding over on to the flat area adjacent to the stream (the floodplain). If we allow for some variation in the elevation of this flow, say +/- 10% of the bankfull level, then this flow may occur for a week or two each year when it does the lion's share of its sediment-moving and stream-shaping work.

The bankfull flow shapes the channel and builds the floodplain; it determines how wide and deep a channel will be (its cross section area). The changes also occur to the snowmelt or rainstorm events up to the 20-year flood size. The mechanism for the increased rate of flow is the synchronization of snowmelt; for rainstorms it is a decrease in infiltration rate associated with the repeated use of heavy equipment. The bankfull flow does not have a recurrence interval of 1 year; it's a little longer, usually in the 1.2- to 1.8-year return interval range, on average it's the 1.5-year return interval. It happens 2 out of 3 years (1/1.5). In the third year, there is either a drought or a true flood. Figure 1 shows how the size of this flow changes when land use changes from forestland to farmland.

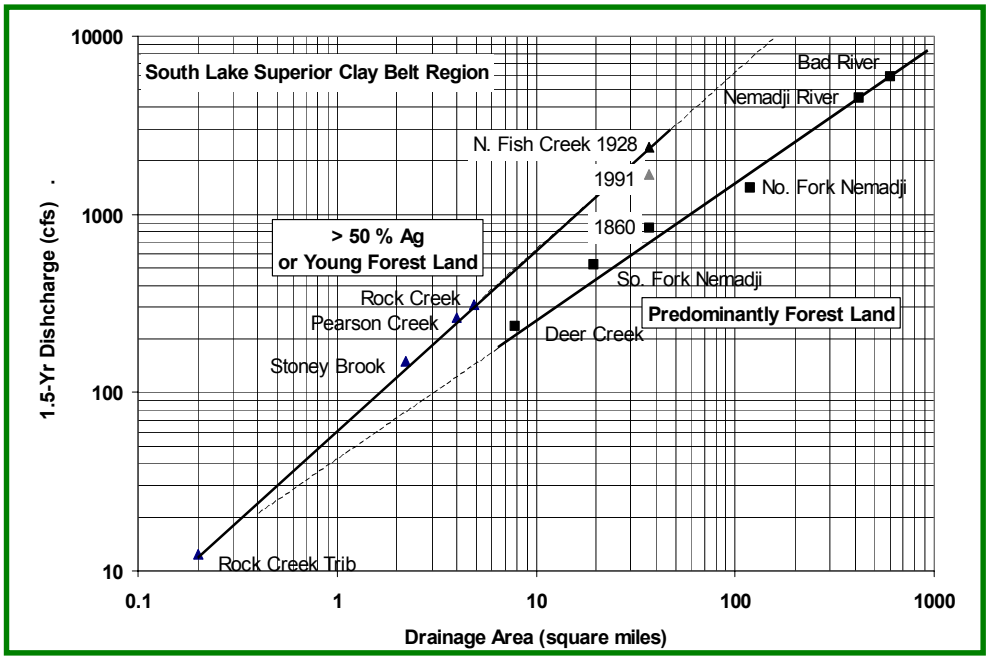


Figure 1. The bankfull flow (cubic feet per second) doubles or triples when land use changes from forestland to farmland in the Southern Lake Superior Clay Belt Region.

The logarithmic scale used in Fig. 1 allows us to draw straight lines. However, reading the actual values shows bankfull flow doubles or triples when land use changes from forestland to farmland. The North

Fish Creek data shows how peak flows changed from 1860 (mature forests) to 1928 (just over 60% farmland) and then diminished somewhat by 1991 after some of the land reforested.

When bankfull flow increases, the channel cross section must change to accommodate it. Usually it widens and pools fill in from the accelerated bank erosion. It's a less attractive channel to fish. How much land use change in a watershed will cause significant increases in bankfull flow. How large of a watershed is needed before the water velocity at bankfull flow will cause channel erosion. Actually, the change in land use first makes the bankfull flow go down a little, but when it get to be 2/rds of the watershed, the bankfull flow doubles or triples.

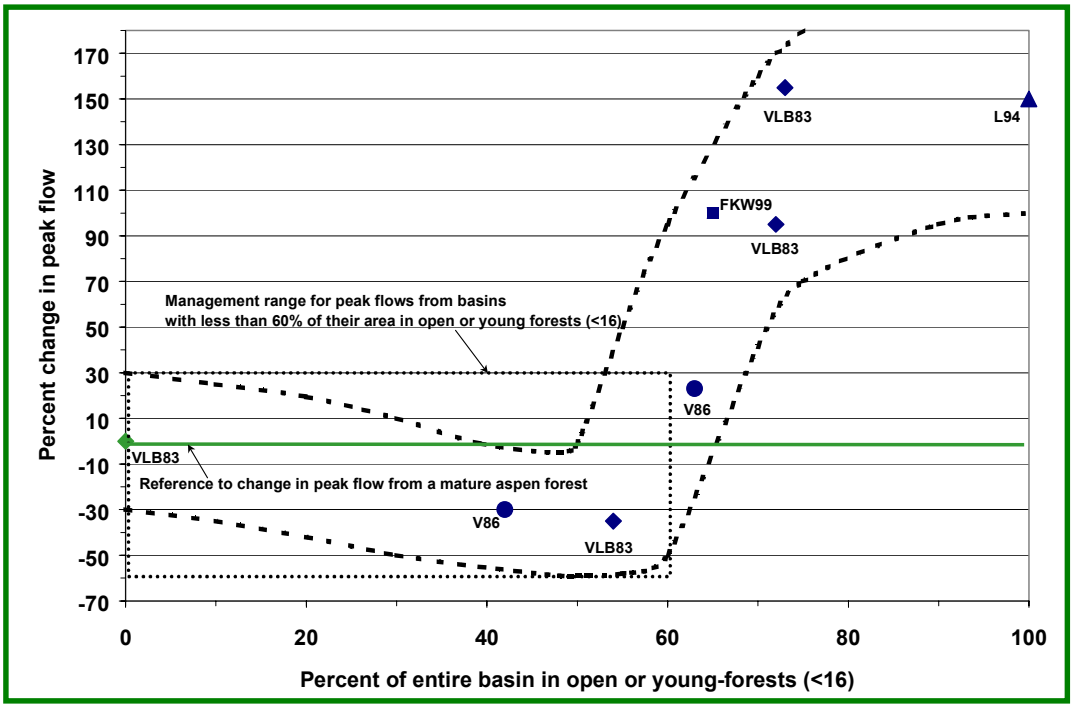


Figure 2. Change I peak flows (in the 1.5- to 20-year flood size) as land use changes from the mature forest condition (0 change) to a watershed with increasing open or young forestland. Points labeled with letters and numbers refer to research data by the authors initials and dates of various studies.

Thus, mixtures of land use are best for keeping the bankfull flows near normal. A management guide is to keep mature forest conditions at more than 40% of the basin, and open or young-forest (taken together as a total) less than 60% of the watershed. The amount of each depends on landowner objectives, but large land use changes will affect the channel forming flows.

Changes in bankfull flows will affect stream shape (width and depth) when the 60% threshold is exceeded on flat watersheds (having hill slopes less than 3%) of 10 square miles or more. In steep watersheds, like moraine hills, with land slopes of 3% to 50%, a watershed of 1 square mile or more is needed before channel erosion occurs. Streams eventually reshape themselves into channels with normal width/depth ratios, but in the Clay Belt Region, it takes 50 to 100 years or more.

February 22, 2001
Sandy Verry, Research Hydrologist

Forestry Sciences Lab, 1831 Highway 169 East
Grand Rapids, MN 55744 sverry@fs.fed.us

Appendix C: *Land Use and Water Quality Fact Sheet*

Different land uses can have a variety of impacts on streams and lakes through runoff and sedimentation. It is important to look at the relative impact of land uses throughout the watershed as a whole in order to gauge the potential impacts to water quality. Land use practices that create impermeable surfaces, expose soil, channel water rapidly to streams, and apply additional nutrients or chemicals to the soil have the greatest potential to impact water quality. These changes can affect both the amount of water reaching a stream or lake, and the type and amount of pollutants in that water. Increased runoff may produce floods, erode streambanks, alter stream vegetation, and scour desirable aquatic habitat. Non-point pollutants can include sediment, dissolved nutrients, plant material, animal wastes, and toxic chemicals. These may impact water quality through sedimentation, turbidity, eutrophication, and fluctuating water temperatures. (For more information, see the Water Resources Fact Sheet in the Appendix) In addition to land use, factors impacting streams within a watershed include soil type, topography, and the intensity and duration of rainfall and snowmelt. In the watershed of the Bois Brule River, land use practices may either increase or decrease the frequent high, fast flows of water in the river that result in erosion of the streambank. These periods of peak flow will have the greatest impact on changes in the stream channel, since the main threat to the Brule is not the sediment carried to it from the uplands but the sheer volume and speed of delivery of water from within the watershed.

The Brule River watershed encompasses 128,000 acres. Land ownership in the watershed is divided between private land (43%), state land (29%), county land (17%) and private industrial forests (11%). The watershed includes a wide hilly area of mostly sandy soils over sand or gravel deposits in the south around the upper river (75% of the watershed) and a narrow valley of mixed sand and clay soils in the north around the lower river (25% of the watershed). The river is spring-fed, resulting in a steady water source year round.

The sandy and sandy/loamy soils of the lower river fall within the Bayfield Sand Barrens and Mille Lacs Uplands ecological landscapes. In these areas, rainfall tends to filter in quickly rather than run off as surface water. The topography of the sandy soils includes pitted outwash, through which much of the rainwater filters to lakes and other depressions instead of draining directly into the Brule River. Therefore, erosion and high overland flow are less of a threat in the upper Brule River watershed, though there is potential for localized erosion along roads, trails, and drainage ditches. Additionally, the sandy areas are more susceptible to groundwater contamination than areas with clay soil.

The clay soils of the lower Brule River watershed, however, lead to considerable high overland flow of water. In this area, which is part of the Lake Superior Clay Plain, water hits the clay surface and runs quickly into streams instead of soaking into the ground. Slopes along the river are steep in many places, and erosion of streambanks is common in high water conditions. The streambanks appear to be clay, but actually contain sand under the clay surface. These steep, sandy banks are the source of much of the sand sediment found in the streambed of the Brule. While not the source of the sedimentation, the clay soils do turn the water reddish brown, and would do so in this watershed regardless of land use. However, certain land use practices increase the flow of water and result in greater streambank erosion and sedimentation reaching the Brule River.

The effects of land cover on streams are most prominent during large rainfalls, floods, and snowmelt (Fitzpatrick, et al. 1999; Verry, 2001). These frequent high flows result in increased hydraulic energy (the energy of the water) that cuts away at the sandy textured channel banks. Generally, less developed and more vegetated land reduce the flow of water to the Brule River.

Land use and land covertypes within the Brule River watershed include forests, wetlands, hayfields, residential developments, cropland, and roads. Within the watershed, the greatest potential impacts to water quality come from roads and construction projects, particularly within the clay plain. Residential areas also contribute to increased runoff and non-point pollution. Agricultural fields allow for more soil loss and water runoff than either hayfields/ grasslands or forests. Hayfields and grasslands that are not tilled have very low soil erosion, slightly higher than that of established forests, and lower than that of young forests (less than 15 years old). The abundance of wetlands and forest in the Brule River watershed helps protect water quality. Forests with considerable ground and canopy cover will prevent soil loss and runoff better than forested areas with less ground and canopy cover. The percentage of the clay and sandy regions of the watershed in each land covertype are shown in Figures 1 and 2. Due to the nature of WISCLAND satellite data, only large areas of a land use appear in these figures.

Figure 1. Land cover types in clay soils in the Bois Brule watershed

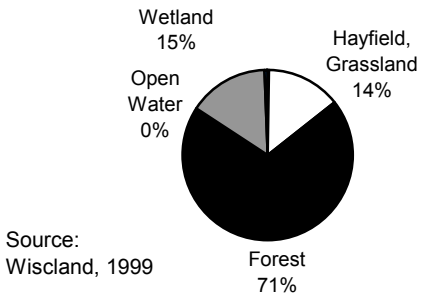
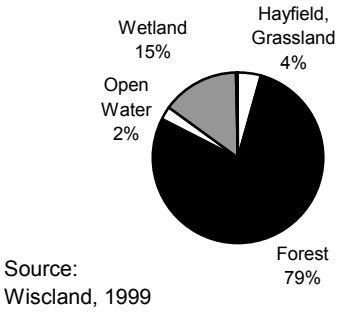


Figure 2. Land cover types in sandy soils in the Bois Brule watershed



One factor commonly used to rate the amount of soil loss due to different management practices is called the "c-factor." The c-factor is the variable in the Revised Universal Soil Loss Equation[1] that accounts for land use type, with higher numbers indicating activities that result in greater soil loss. C-factor values for several land types in the clay plain are listed in Table 1. The lower the c-factor, the lower the chance of harmful soil erosion entering the streams or river. Other factors involved in soil loss are slope, rainfall, and soil type. Some soil types are more likely to erode than others. This is represented in the equation by the "k-factor." Soils that are more erodible have higher k-factor values than less erodible soils. Clay soils range from a k-factor of .43 to .28, while sandy soils range from .24 to .10. On average, sandy soils in this watershed will have approximately half the soil loss of clay soils, if all other factors including land use, slope, and rainfall remain the same.

[1] The Revised Universal Soil Loss Equation is A = R* K* L* S* C* P, where
A = average annual soil loss, R = rainfall erodibility factor, K = soil erodibility factor, L = slope length factor, S = slope steepness factor, C = cover-management factor, and P = supporting practices factor.

Table 1. Land use types, their relative contribution to soil erosion, and their abundance in the clay plain of the Brule River watershed

Land use type in the clay plain	**C-factor for soil erosion based on land use type**(1)	**Percent of state-owned clay plain in each land use type**	**Percent of total clay plain in each land use type**
Forests (stands greater than 15yrs old)	.001	61%	70% combined
Forests (stands 15yrs old or younger) (2)	.01 - .15	16%	
Grasslands/hayfields	.004 - .01	10%	14%
Roads and other bare areas	1.0	<1%	1%
Agriculture	.05 - .15	0%	0.4%

(1) Source: USDA, 1987.

(2) The wide range of c-factors is due to two variables: ground cover and canopy cover. A forest at any age with high ground cover will have very little soil loss. Forests with little ground cover and few canopy trees will have greater soil loss.

For each land use or land covertype in the Brule River watershed, the following descriptions indicate how water may be impacted, how widespread the use type is in the watershed, and who generally owns land managed under each use.

Roads: Roads are the major source of increased runoff and erosion in the watershed. Roads with steep gradients, deep cut-and-fill sections, poor drainage, erodible soils, inadequate culverts, and stream crossings contribute to most of the sediment that runs off into streams and lakes (PUB WR-352-95-REV). Roads, like other impermeable surfaces, increase the amount of water that reaches a river system. They interrupt natural drainage patterns and channel water rapidly to streams. Roads built for forest management would have similar impacts as other temporary, unpaved roads. However, within the Brule River State Forest few roads are built for timber harvest or other management activities. Ten bridges cross the Brule River itself, and many bridges cross Brule tributaries, allowing greater water flow to enter the river. There are just over 1,250 acres of roads in the watershed. Most of these roads are built and maintained by local townships.

Construction sites: An average acre under construction delivers 600,000 pounds (30 tons) of sediment per year to downstream waterways. This causes more erosion than any other use. In general, 50% to 100% of the soil eroded from a construction site is delivered to a lake or stream, while for cropland the figure is only 3% to 10% (UW-Extension. 1997). Although there is some development in the Brule watershed, large acreages under construction are uncommon. Generally, construction sites are privately owned.

Residential and Urban Development: Residential areas have significant potential to impact water quality. Statewide, impermeable surfaces such as roads, roofs, and driveways channel water quickly into storm drains which often empty into nearby streams or lakes. This increased volume of water may carry sediment, nutrients including those from lawn fertilizer, organic matter such as lawn clippings and pet waste, bacteria, metals, pesticides, and other toxic chemicals (UW-Extension. 1997). Housing density in the watershed is low, ranging from two or fewer houses per square mile in much of the watershed, including industrial and state forest land, to greater than 16 houses per square mile near the towns of Brule and Lake Nebagamon (NRPC and WDNR. 2000). Due to the broad nature of land cover data collected for the WISCLAND data series, the exact acreage of residential land in the watershed is unknown.

Cropland: On a state-wide scale, agricultural cropping practices contribute significantly to non-point source pollution through runoff which may carry soil sediment, animal wastes, herbicides and pesticides, and high concentrations of nutrients such as nitrogen and phosphorus. In the Brule River watershed, however, less than 1% of the land is currently cropped. The area does have a significant history of agricultural practice. Much of the land surrounding the Brule River was cleared of forest and burned just before the turn of the century. A portion of it, especially in the clay plain, was then converted to cropland. These changes had lasting effects on channel characteristics of rivers in the region (Fitzpatrick. 1999). Over the past century, much of this cropland has returned to forest through planting or natural regeneration, and some areas are maintained as hayfields. Remnants of agricultural practices such as drainage ditches, which interrupt sheetflow and channel water quickly to streams, are still apparent in the watershed.

Hayfields and grasslands: In the Brule River watershed, some land is maintained in grasses and legumes and is harvested annually for livestock feed. These hayfields are located predominately in the clay plain. In the watershed's clay plain, 23% of private land, 10% of state-owned land, and 1% of county and industrial forests are maintained in grass or as hayfields according to WISCLAND satellite data and state forest reconnaissance data. Generally, hayfields are not tilled and the established grasses/legumes create a thick vegetation layer above ground and a widespread root layer just at the surface that keep soil erosion rates very low, just above those of forests. However, activity such as burning and spraying with herbicides may have some impact on water quality. A recent study of nearby Fish Creek concluded that future changes from pasture/ grassland or cropland to forest will help reduce flood peaks, which are double their pre-settlement rates for that river. However, if some portion not greater than 50-60% of a subwatershed remains "open" as opposed to forested, while at least 40% is in mature forest, snowmelt will be desynchronized (areas will melt at different times) and peak flow reduced (Verry, 2001).

Wetlands: Wetlands constitute 15% of the Brule River watershed (see Figures 1 and 2). These wetlands help to protect the water quality of the Brule River by trapping water and slowing its movement into the river and its tributaries. They also filter sediment and other pollutants from the water, while providing habitat for many species of plants and animals. Approximately one half of the wetlands are in private ownership, while state and county forests each provide one fourth of the watershed's wetlands.

Forests: The vegetative components of forests, including trees, shrubs, plants, and their root systems, stabilize soils, absorb rainfall and slow the movement of water into nearby lakes and rivers. In the Brule watershed, about 80% of the sandy areas and 70% of the clay plain are forested. Within the clay plain, the state owns half of the forested acreage, while just over one third is privately owned, and the remainder is county and industrial forest. The percentage of private land harvested annually is not known, while about 1% of the state-owned acreage on the Brule River State Forest is harvested annually.

One of the greatest potential threats to water quality associated with timber harvesting is the construction of new forest roads. In the Brule River State Forest, new state forest roads are rarely built. All timber harvests in the Brule River State Forest take place more than 400 ft from the edge of the Brule River and are carefully designed to consider the slope of the terrain, the timing of the harvest, and the types of equipment used. These precautions exceed the recommendations laid out in Wisconsin's Forestry Best Management Practices (BMPs) for Water Quality handbook (Holaday 1997). In addition, forest management practices in the Brule River State Forest maintain approximately 85% tree cover in trees older than 15 years of age. This practice, also well above BMP guidelines, serves to slow snowmelt and reduce peak streamflow in the spring.

The Brule River is known throughout the region as an excellent scenic and recreational river. Its water quality and aquatic resources are monitored closely. Nonpoint source pollution may influence the water quality of the Brule, but at present it does not seriously impact animal and plant life. By understanding erosion processes, implementing Best Management Practices for each land use type, and encouraging land uses that benefit water quality, communities and land owners can work together on a watershed level to address potential problems of runoff and nonpoint pollution and continue safeguarding the water quality of the Brule River.

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Appendix D: *Water Resources Fact Sheet*

The Brule River is the central water resource of the Brule River State Forest. The river has been noted as a premier recreational stream since the late nineteenth century, providing canoeing and trout fishing. The State Forest forms a corridor the entire length of the stream, and includes several tributary streams and lakes.

The basin watershed to Lake Superior is about 180 square miles. The River is 45 miles long from its source to the mouth of Lake Superior. The upper half of the watershed lies in rolling sand hill topography of the Bayfield Sand Barrens and the lower half runs through the red clay soils of the Lake Superior Clay Plain. The soils within the watershed influence both the water quality and water quantity instreams, and the difference is evident in the upper and lower watersheds. The sand soils permit rapid infiltration of precipitation and ready movement of groundwater that provides the relatively stable base flow of the upper watershed. The clay soils have low permeability, causing rapid surface runoff of precipitation and high flow rates during short durations. The topography in the Clay Plain is characterized by numerous wetlands and drainages forming narrow, steep sided valleys. The rapid runoff characteristics of the soils cause regularly occurring peaking flows which accelerate erosion and cause instream turbidity in the lower reach.

Other Stream Resources of the Brule River Watershed
There are 165 miles of stream length in the Brule River watershed, with approximately 74 named and unnamed streams and sub-tributaries. Many of these are tributary to the Brule River and affect its overall quality.

Lake Resources
Five small lakes lie within the BRSF. Hoodoo, Rush, Smith, Gilbert, and Mills lakes are small soft water seepage lakes.

Other lakes within the Brule River Watershed include Lake Minnesuing, Gander, Shoberg, Cheney, Whisky, Sunfish, Deer, Lake Nebagamon, Twin Lakes, Steele, Little Steele, Minnow, Carrol, and Pine. These lakes are small with the exception of Lake Minnesuing, and Lake Nebagamon, which have major lakeshore development.

Water Quality of the Brule River
The Brule is known for its excellent water quality. WATER QUALITY can have many definitions and one way to define it is by the method in which it is monitored and measured. The measurements may include WATER CHEMISTRY such as nutrients, PHYSICAL MEASUREMENTS such as temperature and flow, and BIOLOGICAL ASSESSEMENT such as stream invertebrates and fish population monitoring.

In Wisconsin, most water quality monitoring is planned around achieving and maintaining Water Quality Standards, which are designed to support various designated uses. The majority of Monitoring is focused on waters with indications of problem conditions, with the goal to identify and correct the cause of the problems and bring the stream up to its designated use.

Water Chemistry Monitoring
WATER CHEMISTRY can be a quick and simple screening for major problems. However, because water chemistry is a “snapshot” condition of the water at the moment it is collected, many samples are needed

taken over time to show average or trend conditions. The Brule has an extensive historical sampling base for water chemistry for a period from 1973 – 1994. The data show very consistent values and indicate good water chemistry. The most variable parameter appears to be Suspended Solids, an indicator of sediment. The sample site is at Highway 13, and indicates the effects of the Clay Plain hydrology. Even this parameter is relatively low and of good quality for flowing water. Dissolved oxygen consistently runs near 100% saturation, indicating no effects from organic pollutant loading. In summary, these long-term water chemistry data indicate consistently good water quality.

PHYSICAL MONITORING is done concurrent with chemical and biological monitoring. Temperatures support the trout steam classification. Stream level or flow, provides a stable base flow in the upper watershed, important to the seasonal life stages of trout. In the lower watershed flow is more variable and related to runoff events.

Biological Monitoring

Biological monitoring is perhaps one of the best overall monitoring methods, as this kind of monitoring integrates stream conditions over the life cycle of fish or invertebrates. An aquatic organism can survive and be present only if its most critical life cycle conditions are met all of the time.

Invertebrate Monitoring

Stream insects, or macroinvertebrates, have been used as indicators of water quality for organic pollution. Insects most sensitive to the effects of pollution are termed "intolerant organisms", as they can not survive the effects of even small additions of organic pollution. Stream water quality can be measured based on the health of the aquatic insect community. A commonly used index tool is the Hilsenhoff Biotic Index (HBI), which assigns a tolerance value, ranging from zero to 10 for individual species, with zero as the highest quality value. In a 1983-84 HBI study of the Brule River from 15 areas throughout the river system, all sites fell within the "excellent" range, indicating no apparent organic pollution. The study found 21 species of aquatic macroinvertebrates with an HBI tolerance value of zero, indicating exceptional water quality based on the aquatic insect community.

Fish Monitoring

Fish are also a measure of stream quality, and in the case of a healthy Class 1 Trout Stream, indicate continuous high quality conditions that sustain a healthy and reproducing population of a "pollution intolerant fish community." Brook trout are a very good indicator of coldwater ecosystem health. Their reproductive needs are more easily impaired by watershed perturbations than other salmonids. Brook trout provide a good barometer of watershed quality. The brook trout population of the Brule River most closely resembles its original condition and is the healthiest of streams in the Wisconsin Lake Superior Drainage. A separate Factsheet discusses the fish and fishery of the Brule River.

Each of the three monitoring methods - CHEMICAL, PHYSICAL, AND BIOLOGICAL- indicate excellent water quality with good physical conditions, good water chemistry, and an exceptional high quality fish and invertebrate community. Overall, the base of monitoring data indicates the water quality of the Brule River is in excellent condition.

Threats to Water Quality of the Brule River

The Brule River is surrounded by the BRSF. However, of the total watershed size of 180 square miles, about 81 square miles, or 45 percent of the watershed is within the State Forest boundaries. And of that 62.5 sq. miles are in state ownership, which leaves about 65% of the total watershed outside of direct state ownership and management. Threats to water quality are commonly categorized into Point Source and

Nonpoints of source pollution. In the Brule watershed, Nonpoint source pollutants represent the biggest source and threat of pollution.

Point Sources are defined within the state water quality programs as those regulated under a Wisconsin Pollution Discharge Elimination System Permit (WPDES Permit). There are three WPDES dischargers in the watershed.

FACILITY NAME	PERMIT # EXP. DATE	RECEIVING WATER	CLASS	ACTIVITIES
WDNR Brule Fish Hatchery	0004171 03/31/95	Little Brule River and Groundwater	ORW	Fish Hatchery
Brule Sanitary District No. 1	0061158 03/31/98	Groundwater		Municipal
Lake Nebagamon	0031429 06/30/96	Groundwater		Municipal

Nonpoint pollution includes any source that is not a permitted discharge. In the Brule River watershed, this includes street runoff, private waste disposal systems, construction and development runoff, roadside and ditch runoff, and land use practices such as agriculture and forestry. Any land use activity that increases runoff can carry additional nutrients and sediments to the stream.

For the upper watershed, the highly permeable sand soils and predominant pattern of public land ownership and forest cover greatly limit the potential for Nonpoint Source pollution. Nonpoint pollution is closely associated with overland runoff.

For the lower half of the watershed, Nonpoint pollution may be the primary threat to water quality. The clay soils reduce infiltration into the ground, village and rural development is present, and most of the land is outside of the stream corridor and is in private ownership and outside and beyond regulation or protection from Department land management activities.

A primary threat to the lower watershed is simply too much water from too rapid a surface water runoff rate. Runoff rates are increased by land use and development practices that disturb soil and vegetative cover. Activities that remove vegetative cover and reduce infiltration areas with impermeable surfaces magnify flow events in the lower watershed.

Examples include paved roads, driveways, and rooftop surfaces, road and ditch construction which alters drainage patterns, re-exposing raw soils from road and ditch maintenance, and altered infiltration and surface runoff patterns from agricultural and forest management practices may all contribute to accelerated runoff rates.

Water quality problems from increased peak flows include erosion, sedimentation, turbidity, scouring of desirable habitat, and particularly fluctuating water temperatures that can impact sensitive life-stages of fish.

Nonpoint source pollution is an influence to the water quality of the Brule, but is still not causing significant impairment to the aquatic resource base. However, continued protection and improvement may be possible with a watershed-wide protection plan involving all levels of agency, government, and public

participation. Preventing and reducing nonpoint source pollution requires applying best management practices to all land use activities. A project similar to a Priority Watershed Project may be a way to focus on best management practices on each type of land use for the entire watershed and protect the water quality and water resources of the Brule River Watershed.

Appendix E: *Fisheries Fact Sheet*

The Bois Brule River is one of Wisconsin's best known trout streams. At the time of European settlement (1850s) the Brule was already regarded as one of the finest brook trout fishing streams in the state. Wisconsin's settlement push reached the Brule's remote location last (mid 1880s) so its fishery was correspondingly impacted much later by angler over-harvest and logging practices. During this time-period, the majority of the fishery existed in the section of stream from the town of Brule upstream to the Stone's bridge. Brook trout are the only salmonid native to the Brule. Two different brook trout life histories were present originally with the great majority being stream resident (those spending their entire lives in the river). Lake run brook trout (coasters) were also present to a minor extent in the very early history of the fishery but have been only occasionally seen since the late 1880s. Anglers have been continuously concerned about the declining condition of the Brule fishery since the 1890s. In response to the fishery decline locals added non-native rainbow trout and brook trout beginning in the 1890s.

Today's fishery consists of a unique blend of both native and non-native salmonid species exhibiting both resident and lake run life strategies. The present salmonid fishery is both naturally reproducing and self-sustaining. Besides the upper river stream resident fishery the Brule has become a very important spawning and rearing area for lake run salmonids. About 33,000 angler visits are made annually on the river with about 27,000 of these trips targeted at the lake run salmonids (steelhead, brown trout and coho salmon) during the spring and the fall mostly on the lower river downstream of Highway 2. The majority of the remaining 6,000 trips target the stream resident upper river salmonids (brook, brown and rainbow trout).

Angler over-harvest has long been the major limitation to conservation of good fishing in both the resident and lake run portions of the fishery. Angling regulations have become progressively more restrictive as time passes in an attempt to adjust to the growing numbers of anglers compared to static numbers of trout. Angling regulations on Lake Superior tributaries are more complex than those on inland Wisconsin trout streams because of this unique blend of variably maturing stream resident and lake run trout and salmon. Today's regulations are designed to allow trout the opportunity of reproducing at least once before they are available for harvest.

Active fisheries management programs include stocking evaluations, trout habitat improvement, and salmonid population monitoring and sea lamprey and beaver control. Trout stocking is an activity that began in the 1890s on the Brule River and was for the most part curtailed in the early 1980s. A steelhead stocking evaluation is ongoing at this time. The present strategy for sustaining and enhancing trout populations is to improve their ability to restore their populations naturally by revitalizing both spawning habitat and living space. The great majority of available spawning areas in the rivers upper half have been either restored, improved or are currently in the planning stages of being improved. Habitat improvement has been shifting toward restoring living space more recently. Restoring large woody instream cover is being emphasized in the next phase of fisheries management activities. Beaver populations are being controlled on the upper reaches of the stream and tributaries in order to provide trout access to spawning areas and to protect the quality of instream trout habitat. Salmonid populations are monitored by electrofishing (at index stations throughout the watershed), video monitoring (at the sea lamprey barriers fishway window) and at times angler creel census. A sea lamprey barrier was constructed in 1986 as part of an international effort to control lamprey in the Great Lakes and is operated on the river's downstream end. This structure prevents adult sea lamprey from swimming upstream (where they would reproduce) and reduces the Lake Superior population of these non-native fish parasites.

Appendix F: *Land Acquisition Program Fact Sheet*

The Department of Natural Resources administers an active land acquisition program for the purpose of protecting watersheds from the potential impacts of development and poor land use, and to provide additional outdoor recreational and educational opportunities for all citizens. Acquisition of property within key "project boundaries"; such as the Brule River State Forest (BRSF) provides resource managers with the necessary land base to implement sound land use management, thereby protecting the water quality of Wisconsin's numerous streams, lakes and wetlands which provide vital habitat for fish and wildlife as well as the majority of the State's rare and endangered resources. These lands, in turn, are held in trust for the public to enjoy for fishing, hunting, hiking, sight seeing, bird watching, boating and swimming, outdoor education and numerous other public rights.

The Brule River State Forest was initiated in 1907 when Frederick Weyerhaeuser deeded 4,320 acres of land to the State of Wisconsin for forestry purposes. Subsequent grants from the Federal Government and purchases from Douglas County and private land owners increased the Forest area to 5,070 acres in 1909. Until 1936, very little additional land was acquired. Emergency work programs and an increase of tax delinquent lands in the "thirties" resulted in more land acquisition on the Brule. The greatest increase was made in 1945 with the addition of 10,940 acres. In 1959, the boundaries of the Brule River State Forest were extended to Lake Superior. This expansion brought all of the Brule River within the state forest boundary. In 1961, the Outdoor Recreation Act Program made funds available for accelerated land acquisition. As a result, the BRSF's acreage increased rapidly. As of July 1, 1982, there were 38,771 acres under state ownership. Today the boundaries of the BRSF include about 50,000 acres, and currently about 41,000 acres are under state ownership.

Today, properties in the Brule River State Forest are acquired only under a willing seller/willing buyer agreement, or by donation. Department staff maintain a listing of all private landowners within the project boundaries. Contact is made with these landowners at least once every three years in order to explain the status of the acquisition program in the BRSF, and to express an interest in acquiring their properties should they be interested in selling.

The Brule River State Forest Acquisition Plan emphasizes priority on acquisition of large tracts of undeveloped lands, parcels with water frontage, and parcels for future recreation sites. This is accomplished by fee purchase, exchange, donation or conservation easements. Even though priority is given to these more sensitive parcels, other lower priority properties become available more frequently. To maintain an effective acquisition program, the Department pursues properties based on the level of interest of the seller.

There are some areas within the BRSF that the Department does not pursue acquisition, such as within the town site of Brule and in areas controlled by associations of property owners. Many upper river residents have signed an agreement with The Nature Conservancy, which generally subjects them to controls on development of their property. Also, certain circumstances may exist that may render a property undesirable such as an abandoned dumpsite which may present a liability for hazardous materials. Properties that have expensive improvements which are not easily moved or salvaged are generally not pursued. The Department's interest is in undeveloped or underdeveloped land. Structures that exist on an acquired property are typically sold and moved, salvaged, razed or demolished. Natural Resources Board policy currently discourages purchase of any property where the value of its improvements exceed 35 percent of the value of the real estate.

When a landowner is interested in selling their property or other property rights to the Department, the property must be appraised. Department real estate staff perform the appraisal, or contract for those services through an independent certified general appraiser. In either case, the appraisal is an estimated fair market value for the rights which are proposed to be acquired. All appraisals are reviewed by a Department review appraiser to assure compliance with state and federal appraisal standards. Once the appraisal has been certified as complete by the review appraiser, the Department can make an offer to option the property for the appraised value. If the offer is accepted, the Department secures an option to purchase the property within the option period specified. Acquisitions are subject to the approval of the Natural Resources Board and the Governor. If either of them reject the option, the Department cannot acquire the property.

A common concern that is expressed when the Department proposes to acquire private property relates to taxation of public land. Taxpayers and local governmental officials sometimes oppose public land acquisition because the lands are removed from the tax rolls. Although this is true, the Department makes payments in lieu of taxes to offset tax losses. Because the law has changed over the years, the amount of these payments has differed depending on when the property was acquired by the state.

For lands acquired before July 1, 1969, the Department makes an annual payment to the local town government in the amount of $.50 per acre. For lands acquired between that date and January 1, 1992, the state makes payments based on a declining schedule. The amount paid to the town in the first year was equal to the full property tax which would have been collected if the land was still on the tax rolls. In the next year 90% of that amount was paid, then 80%, and so on, declining to the 10% level, or $.50 per acre, whichever is greater; payments in all subsequent years are made at this level. In these cases, the entire amount of the payment is collected by the town and is not distributed to other taxing jurisdictions, such as the county, state, vocational technical adult education and school districts.

The loss of taxes normally collected by the school district is offset (nearly exactly) by increased school aid which is determined by a formula which provides school aid to each school district based on the number of students in the district. This is equalized throughout the state so students in poorer districts have equal educational opportunities to those in more affluent districts.

The loss of tax revenue normally collected by the county is borne by all taxpayers in the county, therefor the impact on an individual landowner is extremely minimal; usually a fraction of a cent per $1,000 of assessed value.

Presently, for all lands acquired on or after January 1, 1992, the state makes a payment in lieu of taxes to each taxation district in an amount equivalent to the property taxes. The only difference between this program and private land taxation relates to assessed value. The initial assessed value of Department lands is set at the Department purchase price of the land based on the appraised fair market value. Subsequently this value is adjusted to reflect the change in assessed value in the taxation district. The first year payment is actually based on an adjusted purchase price. All other aspects of the way the Department pays this aid in lieu of tax under this program are the same as those for a local taxpayer.
Under the payments in lieu of taxes programs, it is clear that acquisition of land for the state does not increase local taxes. Concerns over state owned properties should focus on impacts to the environment, local economy, recreational opportunities and other important issues

Appendix G: *Evaluation of Water Quality in the Bois Brule River System using the Hilsenhoff Biotic Index*

Robert B. DuBois
Department of Natural Resources
Bureau of Integrated Science Services
1401 Tower Avenue
Superior, WI 54880

Introduction

The Hilsenhoff Biotic Index (HBI) uses samples of aquatic arthropods to evaluate the degree of organic pollution in a stream or river. Species of aquatic arthropods have been assigned "tolerance values" that range from 0 to 10 based on their known tolerances for various degrees of organic pollution. By averaging the tolerance values of the arthropods collected at a site, an index value is calculated that places the site into one of seven water quality categories as follows:

Biotic Index Value	Water Quality	Degree of Organic Pollution
0.00 – 3.50	Excellent	No apparent organic pollution
3.51 – 4.50	Very Good	Possible slight organic pollution
4.51 – 5.50	Good	Some organic pollution
5.51 – 6.50	Fair	Fairly significant organic pollution
6.51 – 7.50	Fairly Poor	Significant organic pollution
7.51 – 8.50	Poor	Very significant organic pollution
8.51 – 10.00	Very Poor	Severe organic pollution

Biotic index values were calculated for a number of sites within the Bois Brule River system in 1983-84 (hereafter referred to as the earlier sampling period). These values showed excellent water quality throughout the system. During 2001-02 (hereafter referred to as the recent sampling period) I resampled many of the earlier sites and added some new ones to assess any changes in water quality during that time period within the system.

Methods

The basic sampling methodology has not changed from that originally described by Hilsenhoff (1982; 1987). However, Hilsenhoff (1998) has made a recent modification that has strengthened the index (called the max-10 procedure). This modification is only a computational refinement, and samples collected before 1998 can easily be recalculated using the new modification. To facilitate comparisons between samples collected in 1983-84 and those collected in 2001-02, I recalculated all of the earlier HBIs using the max-10 procedure. Therefore, all of the results expressed in this report were calculated using the max-10 procedure.

For convenience I have separated the results into three categories: mainstem samples, tributary samples, and hatchery evaluation samples. Mainstem samples include four sites that were sampled during both sampling periods (Harvey road, CTH FF, Hall's Rapids, and Winneboujou) plus an additional site at the rapids immediately below Nebagamon Creek. Therefore, the Hall's Rapids values (just above Nebagamon Creek) can be compared with the values from below Nebagamon Creek to assess the impact of Nebagamon Creek on the system. Tributary samples included three sites sampled during both sampling

periods (Rocky Run, Little Brule River, and Wilson Creek) plus samples from two areas of Nebagamon Creek to better understand the effects of lakes Nebagamon and Minnesuing on the system. Hatchery evaluation samples were collected only during the recent sampling period from sites immediately above and below the Cedar Island hatchery on the mainstem and the Brule Trout Rearing Station on the Little Brule River (both facilities are hereafter referred to as hatcheries).

One other difference between sampling periods concerns the inclusion of Chironomidae in the recent samples. Chironomidae were excluded from the earlier samples because the taxonomy was difficult and uncertain, and numbers present in the samples were small. Most of these sites were gravel riffles which is a habitat where chironomids are generally not common. During the early sampling period I concluded that excluding the Chironomidae from the calculations was not likely to have a noticeable effect on the biotic index values. However, several factors have since changed my thoughts and they are included in the recent samples. Most importantly, all of the added sites (above and below both hatcheries and both sites on Nebagamon Creek) have soft, mucky substrates where chironomids are likely to be common. Also, it is now known that chironomids invariably have higher tolerance values than other taxa collected at the same site, and even small numbers of chironomids in a sample can substantially raise the index value at that site. Biotic index values of the recent samples were also calculated without the inclusion of chironomids to facilitate comparisons with the earlier samples.

Results and Discussion

Mainstem samples – Values from the mainstem sites were well within the "Excellent" category during both sampling periods and there was little difference in values between time periods at any given site (Table 1). Inclusion of chironomids had virtually no effect at the lower river sites but did have a slight effect at Hall's Rapids and Winneboujou. However, even with the inclusion of chironomids, water quality in the mainstem from Winneboujou to Harvey Road continues to remain in the "Excellent" category. Water quality in the upper river above Cedar Island (Mays Rips) falls into the "Very Good" category, but no samples were taken there in 1983-84. I don't believe there is any organic pollution in this section of river that is cause by humans. Rather, I think the slow flow and soft bottom that is characteristic of much of the upper river is conducive to large numbers of chironomids which tend to artificially inflate the biotic index values at those sorts of sites. Sites above and below the mouth of Nebagamon Creek were not different indicating no noticeable effect of Nebagamon Creek on the water quality of the Bois Brule River.

Tributary samples – Water quality remains excellent in Rocky Run and Wilson Creek with no substantial differences in values between sampling periods in either creek. Newly established sites on Nebagamon Creek indicate excellent water quality near the After Hours Road bridge but water quality that is only "Good" to "Very Good" at the outlet of the creek near Lake Nebagamon. These findings suggest some (probably slight) level of organic pollution in lakes Nebagamon and/or Minnesuing but that spring inputs along the length of Nebagamon Creek are sufficient to restore the water quality well before the creek reaches the Bois Brule River. Water quality in the Little Brule River above the hatchery continues to remain in the "Excellent" category.

Hatchery evaluation samples – Sites above and below the hatchery outflow at Cedar Island were similar indicating no effect of that hatchery on water quality in the river (values were actually slightly lower below the hatchery). On the Little Brule River, values were substantially higher immediately below the hatchery than above it indicating some organic input from the hatchery. During the recent sampling period, samples were not collected from further down the Little Brule River, which would have been useful. In 1983-84 samples were taken in the Little Brule at Dennis Road and near the mouth of the creek. Neither of

these sites had high values suggesting that the abundant additions of spring flow to the Little Brule River downstream of the hatchery rapidly restores the water quality.

Synopsis – Water quality remains excellent throughout the river system except for sites on tributaries immediately downstream of Lake Nebagamon and below the Brule Trout Rearing Station, but in both cases water quality is quickly restored before reaching the mainstem of the Bois Brule River. Values in the soft-bottomed upper river are also slightly lower than elsewhere, but this is likely due to a peculiarity of the index and does not indicate a problem with organic pollution above Cedar Island.

Overall, values tended to be slightly higher at all sites in 2001-02 than in 1983-84. These differences would not be significantly different in a statistical sense because of the small number of replications at each site, and in all cases the water quality category at the site stayed the same. However, the pattern of slightly higher values during the recent sampling period was consistent throughout the watershed and is not fully explained by the inclusion of chironomids in recent calculations.

I recommend an additional round of sampling in three years (2005) at some of the sites sampled this year plus the addition of a site on the Little Brule River below the hatchery. At a minimum, the sites I recommend to be sampled in the future would include: mainstem at CTH FF, mainstem at rapids below Nebagamon Creek, mainstem at Winneboujou, upper Nebagamon Creek near its outlet at Lake Nebagamon, Little Brule River at Dennis Road. I recommend taking three replicate samples at each site.

Table 1. HBI values at site within the Bois Brule River system
(number of replicates in parentheses; NS = no sample during that sampling period).

Mainstem	**Chironomids Excluded** 1983-84 average	**Chironomids Included** 2001-02 average	**Chironomids Excluded** 2001-02 average
Harvey Road	1.41 (6)	1.55 (2)	1.52 (2)
Below lamprey barrier	1.38 (3)	NS	NS
CTH FF	1.07 (4)	1.16 (2)	1.16 (2)
Rapids below Nebagamon Creek	ns	1.25 (2)	1.17 (2)
Hall's Rapids	1.15 (1)	1.89 (2)	1.19 (2)
Winneboujou	1.66 (6)	2.76 (2)	2.17 (2)
Mays Rips (above hatchery)	NS	4.05 (2)	3.07 (2)
Cedar Island (below hatchery)	NS	3.47 (4)	2.63 (4)

Tributaries	**Chironomids Excluded** 1983-84 average	**Chironomids Included** 2001-02 average	**Chironomids Excluded** 2001-02 average
Rocky Run	1.13 (4)	1.43 (2)	1.31 (2)
Little Brule at the mouth	2.73 (1)	NS	NS
Little Brule at Dennis Road	2.68 (1)	NS	NS
Little Brule below hatchery	NS	5.18 (2)	4.48 (2)
Little Brule above hatchery	2.37 (1)	3.41 (2)	2.90 (2)
Little Brule below Florence Lake	3.47 (5)	NS	NS

Table 1. (continued)

Tributaries	**Chironomids Excluded** 1983-84 average	**Chironomids Included** 2001-02 average	**Chironomids Excluded** 2001-02 average
Nebagamon Creek @ After Hours	NS	1.79 (2)	1.73 (2)
Nebagamon Creek near lake	NS	4.49 (2)	3.93 (2)
Wilson Creek at CR P	1.97 (3)	2.85 (2)	2.81 (2)

References

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Appendix H: *Endangered, Threatened and Species of Special Concern*

Definitions:

Wisconsin Species of Concern: Those species about which some problem of abundance or distribution is suspected by not yet proved. The main purpose of this category is to focus attention on certain species before they become threatened or endangered.

Wisconsin Threatened Species: Any species which appears likely, within the foreseeable future, on the basis of scientific evidence to become endangered.

Wisconsin Endangered Species: Any species whose continued existence as a viable component of this state's wild animals or wild plants is determined by the Department of Natural Resources (DNR) to be in jeopardy on the basis of scientific evidence.

Federally Endangered Species: Any species which is in danger of extinction throughout all or a significant portion of its range other than species of the Class Insecta determined by the Secretary to constitute a pest whose protection under the provisions of the Endangered Species Act would present an overwhelming and overriding risk to man.

Federally Threatened Species: Any species which is likely to become an endangered species, within the foreseeable future, throughout all or a significant portion of its range.

Rare Plants of Special Concern		
Common Name	Latin Name	Habitat
Autumnal water-starwort	*Callitriche hermaphroditica*	Riverine areas
Richarson sedge	*Carex richarsonii*	Dry hill prairies, barrens
Sparse-flowered sedge	*Carex tenuiflora*	Bogs, conifer swamps
Sheathed sedge	*Carex vaginata*	Conifer swamps, fenny bogs, alder thickets
Purple clematis	*Clematis occidentalis*	Rocky woods and streambanks
Small yellow lady's slipper	*Cypripedium parviflorum*	Tamarack swamps, wet meadows, fens, wet prairies
Showy lady's slipper	*Cypripedium reginae*	Swamps, fens, open wetlands, wet woods
Fragrant fern	*Dryopteris fragrans*	Cliffs
Marsh willow-herb	*Epilobium palustre*	Low, wet ground
Vasey rush	*Juncus vaseyi*	Roadside
Fir clubmoss	*Lycopodium selago*	

Rare Plants of Special Concern (con.)		
Common Name	Latin Name	Habitat
Large roundleaf orchid	*Platanthera orbiculata*	Conifer forest, hardwood forest, swamp forest
Northern black currant	*Ribes hudsonianum*	

Rare Amphibian Species of Special Concern		
Common Name	Latin Name	Habitat
Four-toed Salamander	*Hemidactylium scutatum*	Moist decidous forests, abundant moss, shallow cool fresh water

Rare Fish Species of Special Concern		
Common Name	Latin Name	Habitat
American eel	*Anguilla rostrata*	Atlantic Ocean, females migrate up tributary streams, still waters

Rare Insect Species of Special Concern		
Common Name	Latin Name	Habitat
Predaceous diving beetle	*Hydroporus pseudovilis*	Depositional areas along small streams and springs w/ sand and gravel substrate
Caenid mayfly	*Caenis youngi*	Lakes, ponds and slow moving streams with sandy bottoms
Bog copper	*Lycaena epxanthe*	Open bogs with cranberry and other ericaceous components
Bog fritillary	*Boloria eunomia*	Open bogs with cranberry and other ericaceous components
Pronghorn clubtail	*Phanogomphus graslinellus*	Slow portions of streams, large lakes, some ponds
Black-tipped darner	*Aeshna tuberculifera*	Shallow densely vegetated ponds, acid bogs, peaty acidic lakes, some streams
Ski-tailed Emerald	*Somatochlora elongata*	Forest streams w/intermittent rapids, outlets of lakes or ponds
Ebony Bog Hunter	*Williamsonia fletcheri*	Shallow sphagnum filled pools, bog moats
Amber-winged spreadwing	*Lestes eurinus*	Sphagnum bordered lakes or pools; temporary ponds with little vegetation

Rare Insect Species of Special Concern (con.)		
Common Name	Latin Name	Habitat
Zebra Clubtail	*Stylurus scudderi*	Cool sandy streams (trout streams) in forested areas
Bizarre Caddisfly	*Lepidostoma libum*	Small cool streams
Diamesin Midge	*Pseudodiamesa pertinax*	Very shallow soft headwater springs and small spring-fed creeks
Diamesin Midge	*Protanypus*sp.	Oligotrophic lakes

Rare Bird Species of Special Concern		
Common Name	Latin Name	Habitat
American Bittern	*Botaurus lentinginosus*	Marshy reedy lakes, wet or sedge meadows
Northern harrier	*Circus cyaneus*	Meadows, grasslands, sedge meadows, tall marshes
Northern goshawk	*Accipiter gentilis*	Remote tracts of undisturbed, mature hardwood and conifer forests
Merlin	*Falco columbarius*	Open habitats, large lakes, nest in old crows nests
Sharp-tailed grouse	*Pedioecetes phasianellus*	Open habitats, open bogs, abandoned farms
Upland sandpiper	*Bartramia langicauda*	Open grasslands, old fields, golf courses, airports
Yellow-bellied flycatcher	*Empidonax flaviventris*	Extensive blck spruce, tamarack, and white cedar swamps
Gray jay	*Perisorius canadensis*	Boreal forests of spruce and fir, white cedar
Cape May warbler	*Dendroica tigrina*	Boreal forests of spruce, fir, tamarack, and white cedar
Black-throated blue warbler	*Dendroica caerulescens*	Mesic forests of sugar maple, white pine, yellow birch, and hemlock
Connecticut warbler	*Oporornis agilis*	Jack-pine stands
Black-backed woodpecker	*Picoides arcticus*	Swamps, fens,open wetlands, wet woods
Pine Siskin	*Carduelis pinus*	Conifer swamps, boreal forests, and residential areas
Evening grosbeak	*Coccothraustes vespertinus*	Boreal forests of spruce, and fir, sometimes pine

Plants of Threatened Status		
Common Name	Latin Name	Habitat
Fairy slipper, Calypso Orchid	*Calypso bulbosa*	Conifer swamps
Dwarf Milkweed	*Asclepias ovalifolia*	Open pine and oak barrens; Sand prairies
Arrow-leaved sweet-coltsfoot	*Petasites sagittatus*	Wet sites

Reptile Species of Threatened Status		
Common Name	Latin Name	Habitat
Wood Turtle	*Clemmys insculpta*	Forested areas along fast moving streams

Bird Species of Threatened Status		
Common Name	Latin Name	Habitat
Osprey (State level)	*Pandion haliaetus*	Large areas of clear surface water, large streams in forested areas
Cerulean Warbler (State level)	*Dendroica cerulea*	bottomland hardwoods and larger blocks of older hardwood forests
Bald eagle (Federal level)	*Haliaetus leucocephalus*	Large areas of clear surface water, large streams in forested areas

Plants of Endangered Status		
Common Name	Latin Name	Habitat
Lapland buttercup	*Ranunculus lapponicus*	Wet woods and roadside ditches

Bird Species of Endangered Status		
Common Name	Latin Name	Habitat
Caspian Tern (State level)	*Sterna caspia*	Lake Superior for foraging; shoreline for resting
Common Tern (State level)	*Sterna hirundo*	Lake Superior for foraging; shoreline for resting

Appendix I: *GLIFWC Resources of Special Interest Information Tables*

Land Type:	**Brule River Bog**				
Management Actions:	Eliminate Thin / Harvest in Pine Comm.	Manage for Natural Reprod. Pine	Replant Pine Plantations	Regenerate Aspen	
Concepts (1-4):	1	2	4	4	Follow BMP'S
Treaty Resources					
Community Types:					
Aquatic	0	0	0	+	Short term increase
Alder Thicket	0	0	0	0	of shallow grdwtr (1-2 yrs.)
Open Bog	0	0	0	0	
Northern Swamp- Conifer and Hardwood	0	0	0	0	
Northern Mesic Hardwood Forest	N/A	N/A	N/A	N/A	
Boreal Forest	N/A	N/A	N/A	N/A	
Northern Dry-mesic Forest- Red and White Pine	+	+	-	-	
Northern Dry Forest- Jack Pine	-	0	-	-	
Pine Barrens	-	0	-	-	
Deer	-	+	-	+	
Wild Rice	N/A	N/A	N/A	N/A	
Ducks and geese	0	0	0	0	
Bear	-	+	-	+	3-5 yrs negative, then positive
Turkey	N/A	N/A	N/A	N/A	
Beaver	0	0	0	0	
Otter	0	0	0	0	
Fisher	+	+	-	-	
Bobcat	+	0	-	+	
Berries	-	+	0	0	Further discussion
Firewood	+	+	-	+	area of disagreement
Balsam fir	+	0	-	-	
Access	-	+	+	-	
Birch Bark (white birch)	+	0	-		transparency -, notes +
Exotic Species	+	-	-	-	
Fisheries	0	0	0	0	

Indicate predicted impact in each box with one of the following symbols:
+ for positive, 0 for no change, - for negative, and N/A for not applicable

Land Type:	**Lake Superior Clay Plain – part 1 of 2**				
Management Actions:	Thin Pine Plantations	Stop maintaining created grasslands	Seed in Non-Forested uplands	Eliminate Ponds	Reestablish Sheet flow hydrology
Concepts (1-4):	1	1	1	1	2
Treaty Resources:					
Community Types:					
Aquatic	0	+	+	-	+
Alder Thicket	0	+	-	+	+
Open Bog	N/A	N/A	N/A	N/A	N/A
Northern Swamp- Conifer and Hardwood	0	+	+	+	+
Northern Mesic Hardwood Forest	0	0	0	0	0
Boreal Forest	+	+	+	+	+
Northern Dry-mesic Forest- Red and White Pine	N/A	N/A	N/A	N/A	N/A
Northern Dry Forest- Jack Pine	N/A	N/A	N/A	N/A	N/A
Pine Barrens	N/A	N/A	N/A	N/A	N/A
Deer	+	-	-	0	0
Wild Rice	0	0	0	-	0
Ducks and geese	0	-	-	-	+
Bear	+	-	-	0	0
Turkey	N/A	N/A	N/A	N/A	N/A
Beaver	0	+	0	-	0
Otter	0	0	0	-	0
Fisher	+	+	+	0	0
Bobcat	+	+	+	0	0
Berries	+	+	+	+	0
Firewood	0	+	+	0	0
Balsam fir	+	+	+	0	+
Access	0	-	-	0	-
Birch Bark	+	+	+	0	+
Exotic Species	-	+	+	-	+
Fisheries	0	+	+	0	+
Symbols indicate predicted impact in each box : + for positive, 0 for no change, - for negative, and N/A = not applicable					

Land Type:	**Lake Superior Clay Plain – part 2 of 2**						
Management Actions:	Prescribed Burns	Continue mowing & burning	Maintain Created wetlands	Large Aspen Clearcuts	Timber harvest in Boreal stands	Younger Rotation age	Wetland/ Grassland creation
Concepts:	2	3	3	3	4	4	4
Treaty Resources:							
Community Types:							
Aquatic		0	0	0	-	-	+
Alder Thicket		-	0	0	+	+	+
Open Bog		N/A	N/A	N/A	N/A	N/A	N/A
Northern Swamp- Conifer and Hardwood		0	0	0	-	-	0
Northern Mesic Hardwood Forest		0	0	0	0	0	0
Boreal Forest		0	0	-	-	-	0
Northern Dry-mesic Forest- Red and White Pine		N/A	N/A	N/A	N/A	N/A	N/A
Northern Dry Forest- Jack Pine		N/A	N/A	N/A	N/A	N/A	N/A
Pine Barrens		N/A	N/A	N/A	N/A	N/A	N/A
Deer		0	0	+	+	+	0
Wild Rice		0	0	0	0	0	+
Ducks and geese		0	0	0	0	0	+
Bear		0	0	+	+	+	0
Turkey		N/A	N/A	N/A	N/A	N/A	N/A
Beaver		0	0	+	+	+	+
Otter		0	0	0	0	0	+
Fisher		0	0	?	+	+	0
Bobcat		0	0	+	+	+	0
Berries		0	0	+	+	+	0
Firewood		0	0	-	-	-	0
Balsam fir		0	0	-	-	-	0
Access		0	0	+	+	+	+
Birch Bark		0	0	-	-	-	0
Exotic Species		0	0	-	-	-	-
Fisheries		0	0	-	-	-	0
	ELIMINATE THIS COLUMN FOR NOW – does not apply						

Symbols indicate predicted impact in each box : + for positive, 0 for no change, - for negative, and N/A = not applicable

Land Type:	**River and Tributaries**						
Management Actions:	Fish Harvest Regulation	Reduce Beaver Control	Continue Beaver Control	Rehabilitate Spawning Habitat	Rehabilitate Trout Habitat	Stocking Existing spp.	Stocking new spp.
Concepts (1-4):	1,2,3,4	1	2,3,4	2,3,4	2,3,4	2, 3	4
Treaty Resources:							
Community Types:							
Aquatic							
Alder Thicket							
Open Bog							
Northern Swamp-Conifer and Hardwood							
Northern Mesic Hardwood Forest							
Boreal Forest							
Northern Dry-mesic Forest- Red and White Pine							
Northern Dry Forest-Jack Pine							
Pine Barrens							
Species:							
Deer							
Wild Rice							
Ducks and geese							
Bear							
Turkey							
Beaver							
Otter							
Fisher							
Bobcat							
Berries							
Firewood							
Balsam fir							
Access							
Exotic Species							
Birch Bark							
Fisheries							

Management actions require further clarification:

* Some types of habitat could be negative/others positive
* Fisheries management needs clarification and more detail – stocking, regulations, habitat management, dredging, etc.

Indicate predicted impact in each box with one of the following symbols:
+ for positive, 0 for no change, - for negative, and N/A for not applicable

Land Type:	**Mille Lacs Upland**					
Management Actions:	Thin pine to eliminate plantations	Seeding and Replanting	Shelterwood cuts	Small Clearcuts	Scarification for Hemlock Regeneration	Larger Clearcuts and Younger Rotation
Concepts (1- 4):	1	1	2	3	3	4
Treaty Resources:						
Community Types:						
Aquatic	0	0	0	0	0	0
Alder Thicket	0	0	0	0	0	0
Open Bog	0	0	0	0	0	0
Northern Swamp- Conifer and Hardwood	0	0	0	0	0	0
Northern Mesic Hardwood Forest	+	0	+	0	+	-
Boreal Forest	N/A	N/A	N/A	N/A	N/A	N/A
Northern Dry-mesic Forest- Red and White Pine	+	+	+	0	+	-
Northern Dry Forest- Jack Pine	N/A	N/A	N/A	N/A	N/A	N/A
Pine Barrens	N/A	N/A	N/A	N/A	N/A	N/A
Deer	+	0	+	+	+	+
Wild Rice	N/A	N/A	N/A	N/A	N/A	N/A
Ducks and geese	0	0	0	0	0	0
Bear	+	0	+	+	0	+
Turkey	N/A	N/A	N/A	N/A	N/A	N/A
Beaver	0	0	0	0	0	+
Otter	0	0	0	0	0	0
Fisher (requires more explanation)	+	0	+	+	+	?
Bobcat	+	0	+	+	+	+
Berries	+	-	+	+	0	+
Firewood	+	0	+	+	0	0
Balsam fir	+	0	0	0	-	-
Access	0	0	0	0	0	+
Birch Bark	+	0	+	-	0	-
Exotic Species	-	-	-	-	-	-
Fisheries	0	0	0	0	0	0

Symbols indicate predicted impact in each box: + for positive, 0 for no change, - for negative, and N/A = not applicable

Land Type:	**Bayfield Sand Plain**						
Management Actions:	Small Clearcuts	Biological Rotation age	Introduce fire and planting or restoration	Natural Regeneration and Planting	Scarification as site prep*	Economic Rotation age	Replant w/ herbicides
Concepts (1-4):	1	1	2	2	2	4	4
Treaty Resources:							
Community Types:							
Aquatic	0		+				-
Alder Thicket	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Open Bog	0	0	0	0	0	0	-
Northern Swamp- Conifer and Hardwood	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Northern Mesic Hardwood Forest	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Boreal Forest	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Northern Dry-mesic Forest- Red and White Pine	+	+	+	+	+	0	-
Northern Dry Forest- Jack Pine	+	+	+	+	+	0	-
Pine Barrens	+	+	+	+	+	-	-
Deer	+	0	+	0	0	0	-
Wild Rice	N/A	N/A	N/A	N/A	N/A	N/A	NA
Ducks and geese	0	0	0	0	0	0	0
Bear	+	0	+	0	0	0	-
Turkey	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Beaver	0	0	0	0	0	0	0
Otter	0	0	0	0	0	0	0
Fisher (requires more explanation)	?	+	-	0	0	0	-
Bobcat	+	+	-	0	0	0	-
Berries	+	-	+	0	0	0	-
Firewood	0	+	-	0	0	0	-
Balsam fir	+	+	-	0	0	0	-
Access	0	0	0	0	0	0	0
Birch Bark	0	+	-	0	0	0	-
Exotic Species	+	+	-	-	-	-	-
Fisheries	0	0	0	0	0	0	0

Symbols indicate predicted impact in each box: + for positive, 0 for no change, - for negative, and N/A = not applicable *Scarification can bring in exotic spp.

Appendix J: *Brule River State Natural Areas*

Brule Glacial Spillway State Natural Area – Area 5

Description of Site

Following the retreat of the glaciers, Lake Superior drained southwestward through what are now the Bois Brule and St. Croix River valleys. This created the long, narrow, steep-sided, relatively straight valley, which exists today and possesses many unusual ecological attributes. The present Brule River originates from springs within an extensive conifer swamp near Solon Springs, and flows north to Lake Superior. (This swamp is also the headwaters area of the St. Croix River which flows south to join the Mississippi.) The upper stretches of the river are slow, with many meanders, and receive cold, clean water from numerous springs and seepages. Just above Stone's Bridge the character of the river changes: the gradient begins to grow steeper; the bottom materials include gravel, cobbles and boulders (rather than just organic sediments); meanders are much less frequent; and several large spring ponds feed the main stem (rather than numerous small seepages). The State Natural Area runs from the base of the slope north of the river and west of Stones Bridge, follows the 1050 contour line south of the river, and encompasses the state ownership north of Stones Bridge in the spillway.

Significance of Site

This site is of the highest ecological significance. No similar opportunity to designate a State Natural Area with these features is present in the state. The extent and quality of the natural communities present, the aquatic features represented, the unique geological feature (glacial spillway), and the concentration of rare plants and animals found here are not duplicated elsewhere.

Management Objectives for the SNA

Maintain the high quality forested and shrub wetlands for ecological and research values. Limit management in the glacial spillway to research, and monitoring, and the control of invasive exotic species.

Management Prescriptions

1. Exotic species of concern are glossy buckthorn and purple loosestrife. Control methods for these species include pulling, digging, or limited direct application of approved herbicides.
2. Research would be driven based upon findings of previous research work done in the area.
3. No timber harvesting would be performed within the spillway SNA.
4. The only cutting that would occur along the river and public use areas would be done to provide a safe experience to users of the river. This cutting generally will not remove timber products from the area.
5. The fisheries management prescribed for the rest of management area 5 will also be allowed within the SNA.
6. Monitoring of changes to the forest cover and associated vegetation would be conducted using forest reconnaissance and additional methods recommended by Department scientists.

Mott's Ravine State Natural Area – Area 10

Description of Site

Mott's Ravine lies on an old glacial outwash channel and contains patches of dense natural jack pine forest, scrubby Hill's and bur oak thickets, and small pine barrens remnants. Historically, the vegetation of much of this area was pine barrens and pine-oak scrub, with scattered patches of xeric forest. Mott's Ravine contains the full range of vegetation expected on the glacial outwash. Prairie plants such as asters, blazing stars, puccoon, and wood lily are inter-mixed with patches of "heath" containing bearberry, sweet fern, and blueberry.

Significance of Site

These community types are rare and declining throughout the western Great Lakes, making their presence here very significant. The Bayfield Sand Barrens ecoregion contains a large share of the significant occurrences of pine barrens. Mott's Ravine SNA, though not especially large, is still important, especially in light of the management direction on nearby non-state-owned lands. Rare or uncommon species often associated with barrens habitats are found at this site, including prairie skink, upland sandpiper, Brewer's blackbird, Connecticut warbler, and Richardson's sedge.

Management Objectives

Due to the decline of pine barrens, pine-oak scrub, and xeric forest throughout Wisconsin, it is worth maintaining the existing natural community remnants, expanding them where feasible, and developing a management plan which would both maintain barrens and dry forest types. However, for the foreseeable future, barrens and dry forest management opportunities here will be limited in scale with small patches of recently burned barrens, regenerated pine barrens, jack-pine oak scrub, and old xeric forest.

Management Prescriptions

Several management issues are of importance. There is relatively high potential for the establishment and spread of invasive species owing to soil disturbance associated with salvage and replanting operations. Colonies of leafy spurge and spotted knapweed, aggressive exotic plants, were noted in scraped areas along HWY 27 just south of CTH S. Also, the long-term suppression of fire from this ecosystem and the widespread planting of conifer monocultures have not only suppressed many of the native barrens species but has also simplified natural community structure and composition.

1. Invasive exotic species, especially spotted knapweed and leafy spurge would be controlled by fire, pulling, and most likely limited direct application of approved herbicides.
2. Fire would be used for management of the open barrens.
3. The SNA would keep patches of young pine barrens, 20 – 60 year old jack pine/scrub oak forest and old (> 100 years) xeric forest.
4. Timber harvest would occur to manage pine plantations towards barrens or xeric forest community and regenerate pine/oak forest when the mid-aged patches are nearing old status.

Rush Lake Interior Beach State Natural Area – Area 8

Description of Site

This slightly alkaline, softwater seepage lake of 22 acres has clear water, a sandy bottom, and a maximum depth of 9 feet is a unique geologic feature of this landscape. The most notable natural feature here is an undisturbed shoreline with a good example of an inland lake beach. The lake experiences significant natural water level fluctuations which have kept the littoral zone open and allowed colonization by several distinct floristic associations. The inundated zone is composed mostly of spikerushes and bulrushes. The middle beach, with a substrate of moist sand, supports a diverse array of sedges and rushes, creeping clubmoss, purple gerardia, and several large populations of the insectivorous round-leaved sundew. The dry upper beach is vegetated with coarser plants such as grass-leaved goldenrod, boneset, Canada bluejoint grass, and red-stemmed gentian. Along the south shore of the lake, an area of spring seepages was noted.

Significance of Site

This site is exemplary for its aquatic invertebrate community. A rare mayfly, in addition to many uncommonly collected aquatic invertebrates, were documented here. The site also merits recognition for its botanical values, especially its well-developed beach. The site would be the first interior beach designation in the state natural areas program..

Management Objectives

Maintain the site below the high water mark as a State Natural Area. Protect the beach from vehicular traffic.

Management Prescriptions

1. Allow natural water levels fluctuations.
2. Promote research on the interior beach community.
3. Prohibit vehicular use on the site below the high water mark.
4. No chemical treatment of the lake or of stocking with non-native fish.

Brule River Boreal Forest State Natural Area – Area 1

Description of Site

Clay slopes along the Bois Brule River support boreal forest in various stages of recovery. The most mature stands are composed of large white pine, white spruce, balsam fir, balsam poplar, with an occasional white cedar. Younger stands are generally aspen dominated. Paper birch is also sometimes a significant component of the more disturbed stands. Terraces along this stretch of river support swamp hardwood stands, composed of black ash and red maple, alder thicket, and stands of emergent marsh in old abandoned oxbows.

Significance of the Site

This natural community management area offers the best opportunity to protect, manage, and restore a conifer-dominated boreal forest on state forest lands. The State Natural Area represents a portion of the boreal forest that has recovered for a longer period than most of the clay plain forest. The site can be used as comparison area for the restoration efforts elsewhere on the clay plain. Contiguous forest cover is greater than elsewhere on the clay plain, at least on public lands; the steep slopes along the Bois Brule and its tributaries are in a special erosion control zone and not subject to or suitable for commercial harvest.

Management Objectives

Maintain a closed canopy forest, conduct research and monitoring, and remove invasive exotic species.

Management Prescriptions

1. Remove invasive exotic species by pulling, digging or limited direct application of approved herbicides.
2. No timber harvest nor timber salvage would be permitted due to the excessive erosion probabilities and values for comparison woody debris for boreal forest restoration.
3. Hazard trees can be removed for the safety of users. This cutting generally would not remove the material from the area.
4. Research plots to measure changes in canopy, shrub and ground layer vegetation for the purpose of providing a baseline for boreal forest restoration will be established.
5. Deer exclosures may be built depending on funding availability.

Bear Beach State Natural Area – Area 1

Description of Site

The primary features of interest here are several extensive stretches of undeveloped beach along the Lake Superior shore, west of the Brule River mouth. The beaches are composed mostly of sand, and are unvegetated due to their exposure to wave and ice action. Locally, there are small pockets of cobblestones and driftwood "gardens". The site includes the slump clay banks that contain uncommonly occurring combinations of plants and animals. This site will move with time the clay banks are continually eroding, as they have for thousands of years. The clay banks and sandy beach constitute the State Natural Area, and they will move spatially as storms continue to erode the banks.

Significance of Site

During bird migration periods this area is used for foraging and resting by terns, shorebirds, gulls, snow buntings, water pipits and others, sometimes in substantial numbers. Bear sign was common on the beach and in the adjacent thickets. As development pressures on shoreline habitats are high and increasing in northern Wisconsin, this site merits protection in an undeveloped state. Very rare are the opportunities to designate a beach and clay banks State Natural Area on over five miles of unobstructed beach for its biological values.

Management Objectives

Maintain the site for use by migratory birds, natural beach features and uncommonly occurring plants found on the clay banks.

Management Prescriptions

This site was severely damaged by past land use activities. Some of the slopes above the shoreline are unstable, with noticeable seepages. In a few areas raw, eroding slumps are depositing clay sediments directly onto the beach or into the lake waters.

1. The beach and clay banks would have no timber management.
2. No salvage of woody material deposited on the beach.
3. The clay banks would be stabilized with naturally established vegetation. No artificial structure development, nor vegetation planting would take place.
4. Invasive exotic species would be removed using pulling, and limited direct herbicide application.
5. Walk-in and boat beach access would not be restricted.
6. Research and education would be encouraged.

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Maps

Ecological Landscapes of Northwest Wisconsin
Bois Brule Watershed
Land Management
Recreation
Natural Community Distribution
Existing Covertype
Future Covertype
Brule River State Forest Natural Areas

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